THANK YOU FOR GIVING ME THIS OPPORTUNITY TO ACTUALLY TELL YOU WHAT I KNOW

THE ROLE OF EMOTION IN CHILDREN'S LEARNING TASK ENGAGEMENT IN THE ELEMENTARY SCHOOL CLASSROOM

A thesis

submitted in partial fulfilment

of the requirements for the Degree

of

Doctor of Philosophy

in

Education

in the

University of Canterbury

by

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University of Canterbury

2005

ABSTRACT

This thesis examines the classroom emotions of sixty-one 9 – 11 year old elementary school children in two classrooms as they engaged in learning tasks. Emotion data were obtained within the larger context of the Project on Learning using a multi-modal methodology. Comprehensive data collection included continuous observations with concurrent video- and audio-recorded data also collected over two full units of learning in science and social studies. Video-cued interviews and a modified experience sampling methodology (ESM) obtained retrospective and on-line emotion data respectively. Statistical analyses of the ESM data for the whole sample of sixty-one children identified three significant emotion factors – Factor 1 (negative), Factor 2 (positive) Factor 3 (happy), which were then tested against gender, achievement and concept learning. In-depth qualitative analyses of eight specific target children selected from the wider sample provided the contextual and within-child variables in relation to the significant emotions obtained. Specific antecedents were identified for events where children reported some or all of the significant emotion factors while selecting and/or engaging in learning tasks. Findings include a significant gender difference with girls reporting positive emotions more frequently than boys, and that irrespective of individual differences in their achievement measures, when new information was learned the target children reported feeling any or all of the Factor 2 emotions. This finding at a qualitative level was contradictory to the aggregated finding that there was no significant relationship between concept learning and Factor 2. This inconsistency was consistent with previous literature comparing and arguing for both nomothetic and idiopathic methods in emotion research.

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ACKNOWLEDGEMENTS

This thesis would not have been possible without the opportunity and privilege of working with the late Professor Emeritus Graham Nuthall, whose Project on Learning was the context for my PhD research. Having been an undergraduate student of Graham's I had become very interested in his work early in my studies. I respect the valuable contribution that Graham has made to our understanding of children's classroom lives. I am honoured to continue this work to and to have had Graham's support for the contribution that he has enabled me to make. I am delighted that some of the content of my thesis includes work that Graham had read, and which we had discussed together.

I also wish to thank Jill Nuthall for your hospitality, your collegiality and your interest in my work. To Sue Collins, newly met at the commencement of the project I thank you sincerely for your friendship, hospitality, humour, wisdom and collegiality that I continue to appreciate. I look forward to our ongoing research partnership as we work together to continue Graham's work and our own. Thank you also to: Anthea Clibborn-Brown, for your wisdom, humour and expertise in deciphering my hand-written notes; Lynn Ward, for deciphering and transcribing with patience and humour, and Roger Corbett for technical support.

I also extend my grateful thanks to the children of the elementary schools participating in this research project, and their teachers. Without the privilege of being welcomed into these classrooms, and without these children sharing their wisdom, this work would not have been possible.

I wish to also acknowledge and thank the Marsden Fund for funding my PhD Scholarship and the Christchurch College of Education for more recent research funding enabling the statistical data entry and analyses to be undertaken.

I have been fortunate in the quality of research assistance I have received. First, I must express my sincere and many thanks to Sophie Curtis-Ham, for your skills in data entry and computations using EXCEL. I appreciate your initiative, efficiency and useful feedback, including your proof reading latterly. I am also very grateful to Cathy Anderson who has assisted me most efficiently and very kindly with formatting and presentation.

Thank you to Fullbright Distinguished Professor Tom Shuell, who visited the Project in 2002, and with whom I had several helpful and challenging discussions on the entwined nature of emotion and cognition. Thank you for reading and giving feedback on my early drafts of Dion's story and children's decision-making processes.

Thank you Dr. Randolph Grace for your expertise and computations using STATISTICA. I also appreciated your thorough, precise and prompt feedback, your challenges to my ideas, suggestions and intuitions about the possibilities with my data. Thank you also for all that I have learnt from this process.

Thank you Professor Ken Strongman, for your ongoing supervision, mentoring and encouragement throughout the years since my graduate studies in emotion. I will always appreciate you continuing in this role when your duties changed. I value especially the promptness of your attention and your ability to say the right words of encouragement at the right time. Without the positive continuity of your supervision, this thesis might not have arrived yet.

Dr. Jean McPhail, thank you for your ongoing supervision and support since taking over this role when Graham took ill.

Thank you to the late Maurice Enright, and to Monica Pauline Ardagh for first teaching me about emotion, and to my extended Enright and O'Toole families for your roles in this learning. Thank you to my husband Daniel O'Toole for your ongoing emotional and practical support.

This thesis is dedicated to my children Eamon, Liam and Siobhan, without whom I may not learn what I should know.

CHAPTER ONE: INTRODUCTION

Libby:	I like Fridays.
Interviewer:	Why do you like Fridays?
Libby:	Because you're looking forward to the weekend.
I:	Ok so you like Fridays are there any other things you like?
L:	Mondays are ok but I prefer Tuesdays because on Mondays you're are used to sleeping in like Saturday.... Tuesday you're getting used to it.
I:	Yeah me too.
L:	And I hate Thursdays and Wednesdays, cos Wednesdays are at the middle of the week and I don't like the middle of the week cos you know that you've gotta just do what you've done over again (laughs).
I:	Oh ok you've gotta do what you've done over again. Like what do you mean by that?
L:	On Monday and Tuesday maybe you did boring stuff on Wednesday I've gotta do it all again (laughs).

You would not be at all surprised to hear this description of a typical week from someone working in a mundane job. Having once been a government employee myself working in a routine and predictable job, I remember well the TGIF (Thank God it's Friday) conversations with fellow workers. What interests me about Libby's description is that she was not describing the working week of a reluctant employee. At the time of her conversation with me, Libby was 9 years old. She was describing her usual school week and the year was 2000.

Libby (code name) was one of my research subjects within the Project on Learning (Nuthall, 2002). My conversation with her was but one of a total of fifty-two such interviews I had with a total of thirty-four children (9 – 11.5 years of age) from four different classrooms across four different schools. What was compelling about these interviews was that these children were willing and able to discuss their classroom emotions with me frankly, objectively and with the analytical skills of a psychologist. While there were individual differences in their emotion vocabularies, the majority of these children were prepared to engage in this new type of conversation with me about their thoughts, feelings or emotions as experienced during classroom activities. They knew that I was part of a research team trying to understand how children learn. Most of these children had a genuine desire to inform us.

My listening stance was that of unconditional positive regard (Rogers, 1980), which meant that I listened to these children with respect, empathy and a genuine desire to fully understand their

experience. We were equals in this process. As Tyler (all children's names are code names) explained, "What I think is that some people - not like you cos you like research - they don't think that children know much about things ... so that sometimes they don't really bother asking you questions like that". I asked, "So what (does) it feel like now to be able to sit there and say what you think? Is that OK?" "Great" he replied. At the end of each interview I thanked the children, many of whose farewell remarks also confirmed their attitude of assistance. For example Kitty said, "It's my pleasure to help". Kelly said, "My pleasure".

As a researcher I was in a privileged and anomalous situation. For example, it would be impossible for a classroom teacher to spend the amount of time that I spent with these children in this confidential research situation. The classroom is a public domain with very little privacy, with twenty to thirty or more children. Although teachers may generally communicate with, relate to and teach their class as a collective, each child will respond internally - including emotionally - as an individual. Some emotional responses may facilitate learning, while others may hinder learning. Children's emotional responses may not be evident to the teacher, unless they are expressed. Positive emotions might be assumed if children appear excited or happy, while negative emotions might be assumed if children appear sad or angry. However, appearances can be deceiving. For example, children may appear interested yet actually be bored. Therefore I offer my findings as a contribution on behalf of these children towards our increased collective understanding of the role of emotion in their learning experiences.

It is important also to note at the outset that all the children I interviewed liked their teachers and were not critical of their teachers in any way (nor were they asked to be). For example, despite Libby's apparent ongoing boredom, her boredom was not related to her views of her teacher. Nor did she (or some others) believe that school should always be interesting. This latter apparent contradiction will be explored as part of my thesis.

Listening to Children

My habit of listening to children commenced with my involvement in La Leche League as a new parent. Through Parents Centre I continued my parental education in child-centred approaches, the most important of which was Thomas Gordon's (1975) Parent Effectiveness Training (PET). I later became an authorised instructor in both PET and Teacher Effectiveness Training (TET). The Effectiveness model educates parents and teachers in the use of a "language of acceptance ...

[which] frees children up to share their feelings and problems" (Gordon, 1975, p. 32). Such methods create contexts of mutual respect in negotiation and conflict resolution between adults and children, consistent with Carl Rogers' (1980) unconditional positive regard. One particular strategy incorporates specifically identifying and accepting - without a values judgement - any negative emotions arising. This process values emotions as a diagnostic tool in day to day living and communication. Latterly I studied child development and emotion as part of my studies in psychology and education, through which I gained more understanding of the processes underlying Thomas Gordon's Effectiveness model.

From my experience as a Teacher Effectiveness Training Instructor, I also learnt to listen to teachers as we together explored how this model might work in their classrooms. It is noteworthy that during the 1980's the New Zealand government - through the Ministry of Education - actually funded TET nationwide for a few years. My TET Instructor qualification was obtained subsequent to this, and the teachers I worked with undertook this programme at their own expense. Anecdotal evidence was that teachers who learned how to use this model found it very helpful in being aware of how their emotions and the children's emotions might either positively or negatively influence their interactions. An important dimension of both PET and TET is that the parent or teacher also learns how to communicate their emotions in the dynamic as well, so that both parties in the interaction understand and accept the other's feelings without judgement and with a practical focus. For example, what do we need to do to address this to meet both our needs?

Prior to and concurrent with my parenting career, I was a radiography educator. Within the clinical radiographic context I had learned to attentively observe and listen to my patients. One of the mantras I had been taught in my own radiography education was that "The most important person in the X-ray department is the patient." Implementing this philosophy at a practical level meant that we had to pay detailed attention to our patients. To do this we needed to be careful listeners to and excellent observers of patients' signs and symptoms. We needed to know whether our patients were in physical danger, such as cardiac arrest or allergic reactions to contrast media, and ensure that they were not going to fall off the X-ray table. Equally-importantly, we needed to minimise any discomfort, fear or anxiety so that the patient would be comfortable and still before being asked to "Take a big breath in, hold it (expose the X-ray) now breathe away (or breathe on)". The quality of our final product – a sharp, well-defined X-ray image or radiograph – was

fully dependent on our skills in assisting our patients to be relaxed and still. Therefore it was in our interests to gain rapport with our patients.

Within the different contexts described above (whether it be home, school or X-ray department), each adult or person in control of the situation had their own outcomes or purposes with their client/s which were unique to their specific contexts. Therefore they would attend to and value different sorts of data about their clients. Traditionally, learning about emotion and its role in learning has not received much attention in teacher education, which would reduce the likelihood of its use as a diagnostic tool when interacting with school children. In contrast, parental data frequently comes from children's emotional reports such as "I was bored today", or "I got really mad at school today", or "today was so cool, we did cool stuff today".

If teachers are reporting the behavioural data of children to parents and parents are attending mainly to the emotional data of their children, this might result in conflicting perspectives. Children might report positive emotions to the teacher, but are generally less likely to report negative emotions. For example when comparing home and school "versions" of a child, some anecdotal evidence suggests that teachers may regard parents as being biased about their own children and not objective. In contrast, some parents may feel that teachers are judging their children only on their observed behaviours in the classroom. The parent may also believe the child has a more accurate perspective, based on their subjective reports.

Observation in any of these contexts would be able to determine antecedents and consequences of events and consider both the behavioural and emotional perspectives. From our own video-recording and observations during the Project on Learning, it was evident that each child experienced their individual "world" or context at their desk (or wherever they were in the classroom) with most events being impossible for the teacher to see. It would be unreasonable to expect that the teacher should attend to every child's every emotional need in the classroom. Rather, by enabling children or students of any age and their teachers to be aware of how to foster positive emotions that support learning, we shall perhaps be more likely to reduce the negative emotions that hinder learning.

Even when I was teaching radiography, students would occasionally report feeling bored with the lectures or teaching sessions. This was surprising because they had chosen to study radiography, so why would they be bored? However, using feedback methods and a collaborative approach we

eventually came up with more interesting and authentic activities that fostered their interest rather than bored them. This also reflected the need to encourage students to find relevance in some of the topics studied, when they might not immediately see it as relevant. However, this did take time. The lesson from these experiences was that while these students had the long-term goal of qualifying, the teaching methods could not be expected to rely solely on these long-term goals for ongoing day to day motivation. This was even more important for second year students who were mid-way through the three-year programme. In a similar model to Libby's Wednesday above, the second year in a three-year programme was the Wednesday equivalent - except that it lasted the whole year.

The Psychology of Emotion

In 1991, I began studying for my undergraduate degree in education and psychology in conjunction with a Diploma in Teaching (Tertiary). My original purpose was to support my academic role as a tertiary educator. The secondary gain was that my university studies eventually "caught up" with my life experience and I gained another perspective on children's development and their classroom lives. Through my studies I belatedly found the theoretical support and input for my interest areas. For example in 1995, I encountered the significant research findings of Nuthall and Alton-Lee (1993, 1994) based on their meticulous classroom-based research.

Concurrently, my studies in psychology were also supporting my understanding of the learning process. As a radiographer I had some prior knowledge of the anatomy and physiology of the brain and nervous system. My existing knowledge included mainly surface and gross anatomy at the level required for radiography, and as demonstrated in radiographic images including CT (Computed Tomography). For example, I had not encountered the amygdyla or hippocampus until I began studying neuropsychology. These structures had not been relevant during my training, perhaps because there was not enough difference in their atomic numbers within the temporal lobes for them to be specifically demonstrated or imaged with the technology at the time. Certainly, any radiographer working with Magnetic Resonance Imaging (MRI) would now be learning about these structures.

The scientific basis of the wide range of these new neuropsychological concepts I was encountering appealed to my understandings within the biomedical model and persuaded me

towards the biopsychosocial model of health and well being. They also offered plausible explanations of the underlying structures of some of the emotion-related events that occur on a daily basis. For example the "emotional highjack" (Goleman, 1995, p.17) by the amygdyla over the executive function of the brain possibly explained the psychological impact of stress in the classroom or hospital context. This might be evident in situations where children or patients are given long explanations about school work or health, which they are unable to attend to or remember if they are stressed or anxious at the time. This concept also perhaps explained a child's lack of academic performance in school when experiencing stress and anxiety. Hebb's (1949) rule of emotional conditioning at the synaptic level offered a neuropsychological explanation for the classical conditioning of emotions. Within the health context, understanding the concept of classical conditioning of emotions is important when dealing with conditioned anxiety or anticipatory nausea during chemotherapy (Sheridan & Radmacher, 1992). These phenomena may certainly be paralleled in relation to school anxiety.

Rationale for my Research

When I started studying the university paper EDUC 323 Classroom Learning Processes (University of Canterbury) in 1995, I was excited to find that there was New Zealand based research in the area of my greatest passion. In the weekly assignment material handed in to the late Professor Emeritus Nuthall for marking and feedback, there was a section for "your question". On 31st May 1995, I wrote, "How does one get into this line of work?" The answer came back that "it takes funding" and that we could talk about this sometime. At that stage I did not follow this up, but the seeds had certainly been planted. By 1998 I had resigned my radiography education position and was completing my honours degree in psychology, with a focus on preparing for training in clinical psychology, which I saw as a relevant application of my combined life experience and studies to date. Perhaps it was "synchronicity" (Bolen, 1994, p. 4) but at the end of 1998, when I had completed my First Class Honours in Psychology, I happened to clear my student email and found an advertisement for the position of research assistant. This position also brought with it a PhD scholarship with the late Professor Emeritus Graham Nuthall's Project on Learning. At the time I was reading "Voyages of the heart" by Averill and Nunley (1992). I felt the need to follow a path with a heart. It was unlikely that I would be able to undertake both clinical psychology training and the research position simultaneously. In the end, how could I *not* apply?

My research interest in children's emotions was timely and relevant, as Nuthall (1999) had identified the need for more attention to these aspects of student experience.

> Another problem with our data is the relative lack of attention to the motivational and attitudinal aspects of the students' experiences. Before any analysis of the ways in which students learn how to learn is complete, it must incorporate a parallel analysis of the ways in which students acquire interests and attitudes. (Nuthall, 1999, pp. 249 –250)

The data referred to above related to the Understanding Learning and Teaching Project (Nuthall, 1999). The Project on Learning was a planned further series of classroom studies, which provided an exceptional opportunity for me to explore my research interests. At the time of my research proposal (1999), there was already reasonably robust evidence of the importance of emotion in relation to interest, motivation and task engagement in school settings. The majority of these findings had been based on correlational data from self-report methodology, although some case studies and interview methods had been used. What was scarce at the time of my own proposal was evidence of the type of detailed data as yielded from the Understanding Learning and Teaching Project, and planned for the Project on Learning, to account for the moment by moment impact of mood or emotion on task engagement. Because "emotion is a daily, if not a moment by moment occurrence" (Strongman, 2003, p. 2), the project's methodology offered a unique opportunity to attempt to observe for these occurrences.

As will be presented in my thesis, my research methodology has evolved during the three-year series of classroom studies, and the subsequent years spent analysing these data. Ranging from the initial question as to whether children's emotions could be observed and video-recorded, to in-depth interviewing about their emotions during video-cued interviews and finally eliciting emotion data through modified experience sampling (Csikszentmihalyi, 1975), my thesis will report in detail a methodology which was comprehensive and thorough. Structurally, the Project on Learning provided a venue and a vehicle in which I could record, observe and interview a range of children about their classroom experiences. It also provided a range of classroom contexts and curriculum topics over time, which enabled within-subjects, between-subjects, within-classroom and between-classroom studies of specific aspects of emotion as they appeared to be relevant over the progression of the project.

The classroom context provided a naturalistic observation setting, and being largely self-contained, was "an ideal environment for 'real-life' research" (Nuthall, 2002, p. 2). The

technology would provide the opportunity to correlate observable behaviours in contexts, including social interactions, self-talk, inter-peer talk, student-teacher talk, task engagement, and performance outcomes. In addition, the opportunity to interview the subjects, using the video record of observable behaviours within classroom events, would facilitate a unique investigation of children's moods or any obvious emotion event in relation to task engagement. Antecedents to task engagement may be either overt or covert. Distracting thoughts, negative affect, or any attributions, which influence engagement or non-engagement, would be accessible through the interview.

Details matter to me. As a diagnostic radiographer I have been trained to pay attention to the finest detail. As already explained, this ranged from careful and detailed observation of the patient to detailed examination of the radiographic image for sharpness and detail. Microscopic lesions on a radiograph may have the macro-capacity to impact one's health. For example the purpose of asymptomatic mammography screening is to find tiny lesions before they are palpable in order to save life through immediate treatment. Generalising this approach to analysing the classroom experiences of children has resulted in my being interested in the finest details, such as the moment by moment sequences of events within the 15-second intervals, and the subtle changes of expression on the children's faces as recorded on video. I value these momentary events for their potential significance in understanding children's classroom experience. The potential disadvantage of this approach is the risk of becoming "bogged down" in too much detail. Therefore my thesis will provide both micro and macro evidence as appropriate.

Investigating Emotion

Greenspan (1997) critiques the lack of attention to the role of emotion in children's thinking and education. His comments seem to reflect my own experience and views. Interestingly also, his comments appear to be consistent with Libby's experience of school, where she is "held" between Fridays. Despite not having read Libby's interview data, Greenspan (1997) appears to understand why she likes Fridays.

> Schools also tend to pay relatively less attention to the emotionally based generative aspects of thinking – the ability to create ideas – and instead focus relatively more on the ability to organise and sequence ideas. Unless we begin to build awareness of neurological and emotional development into our educational programmes, we will continue to fail to educate large numbers of children even

> after holding them for thousands of hours in the classroom (Greenspan, 1997, p. 212).

My research proposal was entitled "Investigating the role of emotion or mood on task engagement in the elementary school classroom". The prime purpose of my study was to investigate the presence and extent of emotion or mood states as variables influencing learning task engagement.

As an exploratory study, the original question was broad. For example, would it be possible to elicit data on children's moods or emotions in the classroom? What methods could we use to explore this question? What are the emotions or moods which children actually experience in classroom life? How is the emotional life of classroom life shaped or affected by classroom events? What are the emotions or mood states, which occur during the process of being involved in classroom activities? What moods or emotions promote learning? Are there differences between able students and those less able? Is there evidence of gender differences? Is there any evidence relating to time on task in relation to emotion antecedents?

Fortunately, the theoretical perspectives of Lazarus (1991), and Oatley (1992), in conjunction with Nuthall's (1999) model of learning, have provided a useful structure through which to attempt to analyse the vast qualitative data yielded from my research project. In addition, through the experience sampling data also obtained, statistical analyses modelled on those conducted on similar data from adult university students has enabled comparisons between students across these ages. The findings presented in my thesis should assist in arguing the case that children's emotions and their reports about the most significant emotions in the school context should not only be heard, but also should be sought and welcomed.

Thesis Overview

Chapter One has provided an introduction to and rationale for my thesis. It has located my research within the Project on Learning and concludes with my research questions and overview of the thesis.

Chapter Two presents the theoretical framework. The theoretical perspective underlying my thesis on emotion in the classroom is eclectic. This chapter will present the key emotion theories

of relevance, also locating my research question within the context of the socio-constructivist classroom.

Chapter Three presents the literature review. Commencing with a review of the developmental literature on children's emotions, this chapter then proceeds through the various methodologies and findings on children's emotions in the education context. Finally I review the more recent experience sampling methods of obtaining emotion data. The literature review concludes with the argument for using a multi-modal methodology.

Chapter Four describes the multi-modal methodology. The methodology was an evolutionary process. The story of this evolution is extremely relevant to my thesis as methodology is implied within the original research question through inclusion of the term "investigating". This chapter answers the question of whether and how it was possible to elicit data on these children's moods or emotions. Both quantitative and qualitative methods were used.

Chapter Five reports the quantitative results from the experience sampling data collection in the final two classroom studies. These results and those from a confirmatory factor analysis and subsequent testing of the emotion factors obtained against the variables of achievement, gender, prior knowledge and concepts learned are also reported. My significant findings are discussed in relation to two sets of perspectives of emotion, namely state versus trait and dimensional versus discrete perspectives.

Chapter Six reports my qualitative findings on the overall contexts from which the experience sampling data were obtained. This chapter introduces the specific subjects or target children, whose quantitative and qualitative data constitute my thesis. This contextual analysis addresses the role of the classroom context in children's classroom emotions.

Chapter Seven puts one single decision under the microscope and reports a micro-analysis of the wide range of variables related to one child's first choice of task or activity when a range of options was provided.

Chapter Eight extends the in-depth analysis of a single decision, to the wider sample of the four target children in the same classroom.

In Chapter Nine, I report my detailed qualitative findings on two of the target children from the previous chapter, as they proceed through a single classroom session.

Chapter Ten summarises the most significant findings from the quantitative and qualitative analyses. These are compared with interview data from the wider sample across four classrooms on the main themes arising.

Chapter Eleven is the final "Discussion" chapter, which commences with a summary of my main findings. Three main themes arising from the multi-methodological findings are proposed.

CHAPTER TWO: THEORETICAL PERSPECTIVES

In this chapter, I discuss the two main theoretical frameworks relevant to my inquiry investigating the role of emotion in children's learning task engagement in the elementary school classroom. In Section One, I focus on the theoretical perspectives of emotion. In Section Two, I focus on the research context – the constructivist classroom. I conclude this chapter by relating the relevant emotional theories to Nuthall's (1999) transactional model of learning, this model also reflecting a socio-constructivist perspective on knowledge construction. The role of tasks as mini-contexts for both emotion and learning will be argued, confirming the compatibility of these two theoretical perspectives as the appropriate context for my research question as to the role of emotion in children's learning task engagement in the elementary school classroom.

Section One: Theoretical Perspectives on Emotion

Section One begins with an examination of the definitions of emotion as they pertain to my research question. The key emotion theorists and theoretical concepts underpinning my inquiry will also be introduced. The diversity in theoretical perspectives on emotion is reflected in the equal diversity of issues raised when considering emotion. Section One will include brief discussions on the various relevant aspects of emotion, including the physiology of emotion, emotional development, emotion vocabulary and ambivalence. I shall also examine the two-sided issues such as state versus trait and emotion versus mood perspectives on emotion. The relevance of these various aspects of emotion to my research question and in particular to the research subjects, will be identified throughout the discussion. Section One will conclude with a working definition of emotion proposed. Due to the research context being socio-constructivist in terms of both the research project and the classroom itself, the constructivist perspective on education will then be discussed in Section Two.

What is Emotion?

The lack of consensus as to a single theoretical definition of emotion reflects the "long and complex" (Lazarus, 1991, p. 3) history of the study of emotion. Currently, there are at least 150 theories of emotion (Strongman, 2003), with the implication that there must be at least 150 associated definitions. For example, emotion might be "a transformation of the world" (Satre, 1948, p. 58), or "a flickering, intricate mixture of thoughts, memories, feelings, bodily

perturbations and behaviour"(Strongman, 2003, p. 90). Aristotle (384–322 BC) defined emotions as "all those feelings that so change ... [people] as to affect their judgements, and are also attended by pain or pleasure" (Oatley & Jenkins, 1996, p. 12). B.F. Skinner (1974) has described the exploration of emotion is possibly "one of the great disasters" (p.165) of psychological research, and that feelings are used to justify behaviour only when we do not understand the true causes of a response. Averill and Nunley (1992) interpret this as implying that "references to feelings are masks for ignorance" (p.51). In an impassionedly expressed contrast to Skinner's perspective, Lazarus (1991) argues for the centrality of emotions:

> It is inconceivable to me that there could be an approach to the mind or to human and animal adaptation, in which emotions are not a key component. Failure to give emotion a central role puts theoretical and research psychology out of step with human preoccupations from the beginning of recorded time (p. 4).

Citing Plutchik (1962), Lazarus (1991) also acknowledges that philosophers "from Aristotle to Spinoza, from Kant to Dewey" (p. 4) and numerous others have speculated and hypothesised about emotion. Artists, musicians, poets, writers, advertisers, politicians – the list is endless - also wittingly or unwittingly appeal to and manipulate our emotions, for their various purposes. Oatley and Nundy (1996) agree with the centrality of emotions, also reminding us that emotions have not always been valued:

> Emotions have come to be thought of as not just disruptive, regrettable, or obsolete, as had been assumed by researchers at the beginning of this century, and as we might think if we only paid attention to data on emotional disorders. Emotions are functional and indeed central to mental and social life (Oatley & Nundy, 1996, p. 267).

The theoretical perspective on emotion for my inquiry draws mainly from Lazarus (1991), Oatley (1992), Oatley and Jenkins (1996), and Oatley and Johnson-Laird (1998) with reference to other theorists as appropriate. These theorists have been chosen due to the comprehensiveness of their theories, which are in agreement with many others. In addition they both continue to be cited in the current literature on emotion and learning. Both Lazarus and Oatley acknowledge the contribution to their thinking of significant other theorists. For example, Oatley and Jenkins (1996) attribute Aristotle's definition above for having "laid some of the foundations for an evaluative (cognitive) and action-readiness approach towards understanding emotions" (p. 11). Lazarus (1991) explains that, "I have always had an affinity for this position" (p. 174), about Aristotle's position on goals. Lazarus proposed the "cognitive-motivational-relational theory" (p.

38) of emotion, while Oatley and Johnson-Laird first proposed the communicative theory of emotion (1987, in Oatley & Johnson-Laird, 1998), subsequent to which these theorists have continued to explore and contribute to emotion theory.

Lazarus (1991) acknowledges that "emotions are individual phenomena and display great variations among individuals" (p. 7). His more formal definition of emotion is, "Emotions are organised psychophysiological reactions to news about ongoing relationships with the environment" (p. 38). Lazarus explains that the individual's subjective evaluations or cognitive appraisals about this "news" (p. 38) will include its impact on one's goals, one's knowledge of progress towards and one's beliefs about these goals. Lazarus (1991) sums up by stating:

> Emotions are, in effect, organized cognitive-motivational-relational configurations whose status changes with changes in the person-environment relationship as this is perceived and evaluated (appraised). (p. 38)

Lazarus's (1991) cognitive component relates mainly to the appraisals or evaluations made in response to antecedent variables in an adaptational encounter. Antecedent variables include any environmental variable such as the "demands, resources and constraints with which a person must deal, and the imminence, uncertainty, and duration as some of the formal conditions that provide information about what is being faced" (p. 87). Classroom contexts and interactions provide numerous examples of such antecedents to emotion, as children cope with teacher and peer interactions, understanding what is expected and locating the resources they need and so on. Lazarus's motivational component relates to both dispositional or trait aspects (including goal importance and attainment) of motivation which might be assumed to relate to positive emotions. Trait motivation is seen in this theory as an antecedent condition of emotion. Trait perspectives on emotion will be discussed shortly. Lazarus's (1991) "transactional motivation" occurs "when a harm or threat has actually generated a negative emotion – say anger, anxiety, shame or guilt" (p. 98). This leads to the "relational" component of his theory or "core relational theme" which Lazarus (1991) defines as, "simply the central (hence core) relational harm or benefit in adaptational encounters that underlies each specific kind of emotion" (p. 121). Lazarus (1991) proposes specific core relational themes for fifteen individual emotions. For example the core relational theme for anger is "a demeaning offence against me or mine" (p.122), and for happiness, "making reasonable progress toward the realization of a goal" (p. 122).

Considering the extent and comprehensiveness of Lazarus's (1991) theory, it is beyond the scope of this work to discuss every relevant aspect at this stage. The key value of his theory to my inquiry is that it is fully congruent with constructivist perspectives on teaching and learning. Mandler (1990) actually categorises Lazarus's theory as constructivist explaining that "the response of a cognitive constructivist is that whatever the array of attributes and features in the environment might be, it needs analysis and processing by underlying representations" (Mandler, 1990, p. 23). It is important to note however, that while acknowledging the cognitive component of emotion, Lazarus emphasises that "cognitive activity in the emotion process does not equate emotion with cognition" (1991, p. 178). In other words, emotion may have cognitive causes and components, but emotion is not "merely a form of cognition" (p. 178). Observable variables relevant to Lazarus's theory of emotion are:

- Actions such as attack, avoidance – moving towards or away from a place or person, weeping, making facial expressions and so on.
- Physiological reactions such as autonomic nervous system responses, can be measured by instruments, but some may be observable such as a reddening face from embarrassment.
- What people say about their emotions in self-report. Self-report is constantly debated, but they do comprise part of the observable data and may be interpreted in the contexts of the other sources of data.
- Environmental events and contexts, including the social, cultural and physical events under which an emotion occurs.

These observable variables are frequently entwined and very relevant when considering the elementary school classroom, in which children may be observed to experience any or all of these variables. Anecdotally, laughter, smiling, frowning, crying and other facial expressions have been observed in classrooms. Anecdotally also, when children arrive home from school they frequently report having experienced various positive or negative emotions during the school day. Lazarus (1991) cautions that treating this group of observable variables as emotional phenomena moves towards interpretative inference and theory. Lazarus's non-observable variables are:

- Action tendencies - the private impulses towards behavioural responses (muscle tension may be observable however)

- Subjective emotional experiences – affect or feelings, which can only be elicited through self-report
- Person-environment relationships – how the person is interpreting this in relation to beliefs goals and so on
- Coping processes or strategies – the complex inferences a person uses to influence their appraisal
- Appraisal processes, the "core construct of a cognitive-emotional-relational theory of emotion, are also knowable only through inference" (Lazarus, 1991, p. 45).

Action tendencies refer to any behavioural response anticipated and prepared for, as a result of the emotion. For example, in a classroom situation, embarrassment or other negative emotions might underlie a child's avoidance of peers, the teacher or the task, depending on what elicited the negative emotion. Coping processes alter the relationship between the person and the environment, either through re-appraisal or in reality. For example, to cope with disappointment a child might say, "I didn't really want that book", or she might find another one instead. In either case, the emotion should move from negative to positive. Eric Idle's (Monty Python BBC television) adage to "always look on the bright side of life", might be a popular example of Lazarus's (1991) re-appraisals.

The disadvantage (yet probably the most fascinating aspect also) is that information about non-observable variables may only be obtained through self-report. Lazarus (1991) accepts the arguments for and against self-report data. However, this does not preclude researchers from being interested in these variables, but implies that more than one source of data on any of these variables will strengthen a researcher's interpretation.

Oatley (1992) has published extensively on emotion and his theory also gives a prime role to cognition and goals.

> Emotions derive from cognitive processes for integrating multiple and sometimes vague goals and for managing the associated plans that are enacted with limited resources in an uncertain environment, often in conjunction with other people (Oatley, 1992, p. 43).

Similar to Lazarus's (1991) core relational theme for happy, Oatley (1992) argues that happy emotions occur when things are going to plan and unexpected events can be dealt with. Similarly

when things are not going according to plan or potentially unresolvable problems arise, negative emotions occur. Oatley also acknowledges the importance of current resources being available to prevent negative emotions. These resources might be environmental or within the person. Oatley also acknowledges the importance of individuals' underlying or "background goals" (p. 44). This aspect of Oatley's perspective assists in our understanding of how one's personal values system might have a role to play in their emotional responses. In some social situations this might explain individual differences in emotional responses. For example, anecdotal evidence is that currently some members of the New Zealand population are angry about a cartoon series that portrays the pope as a tantrum-throwing child, while other members of the population may have no emotional reaction to this at all.

Oatley and Johnson-Laird (1987, in Oatley & Johnson-Laird, 1998) proposed the communicative theory of emotions, which they subsequently revised in 1998. As explained by Oatley, "emotions communicate both to ourselves and others; within the cognitive system they communicate along the different parts of the system; and in a social group they communicate among individual people" (Oatley, 1992, p. 44). In addition to acknowledging the social context and other similarities to Lazarus (1991), the communicative model also acknowledges the autonomous and inaccessible parts of an individual's cognitive system. Conscious awareness is only available at the "topmost level of the cognitive system that contains some model of the system's goal structure and knowledge base" (Oatley, 1992, p. 44). By acknowledging the inaccessible or unconscious components of the cognitive system, this theory also implies a role for emotions as a diagnostic indicator. For example, if emotion is the communicator to the self (or others in a social context) as to one's progress towards goals, it may be the first indicator or signal to the self (or others) that a goal is being blocked. For example, a person may feel angry without immediately knowing the reason. The reflective process may bring the cause into awareness or not. As Oatley (1992) also explains, "acausal emotions" are 'problematic' for appraisal theorists, but they do occasionally occur" (p. 63). Irrespective of whether or not there is a conscious cognitive appraisal, Oatley argues for the importance of goals in relation to emotion:

> Each goal and plan has a monitoring mechanism that evaluates events relevant to it. When a substantial change of probability occurs of achieving an important goal or sub-goal, the monitoring mechanism broadcasts to the whole cognitive system a signal that can set it into readiness to respond to this change. Humans experience these signals and the states of readiness they induce as emotions (Oatley, 1992, p. 50).

Strongman (2003) supports the role of emotion as a means of communication about progress towards goals. Comparing this process to physical pain, Strongman (2003) sees emotion as providing us with personal information that may be important for our well being and perhaps even to our survival. Similar to Lazarus (1991) and Oatley (1992), Strongman (2003) also confirms the centrality of emotion.

> Emotion permeates life, it is there as a sub-text to everything we do and say. It is reflected in physiology, expression and behaviour; it interweaves with cognition; it fills the spaces between people, interpersonally and culturally. Above all emotion is centred internally in subjective feelings (Strongman, 2003, p. 3).

Strongman's (2003) definition captures the cognitive, social and communicative aspects of emotion similar to both Lazarus (1991) and Oatley (1992), also acknowledging its biological components. The location of emotion in the "sub-text" (Strongman, 2003, p.3) of life allows for its unconscious presence as well. It is also interesting that despite Skinner's (1974) narrow views of emotion above, Lazarus (1991), Oatley (1992) and Strongman (2003) have each acknowledged a behavioural component or action tendency within their definitions of emotion.

Social components of emotions are addressed in Averill and Nunley's (1992) social constructionist theory of emotion. Averill and Nunley (1992) propose that "emotions are constructions in much the same sense that language is construction ... biology has given us the capacity – actually a variety of different capacities - for emotion" (p.xii). This is consistent with a point made by Bereiter (1990) that as far as mental structures are concerned enculturation is no different from any other adaptation process. Ultimately various aspects of the outer world enter cognition only as different types of content (Bereiter, 1990). The social constructionist theory might be seen to contradict Lazarus (1991) above, a theory he sees as "only drawing on a partial truth" (p. 25) thus giving social context a higher priority than it deserves in relation to the other variables. It also appears to equate cognition with emotion. However Lazarus (1991) does regard social communication as one of the "stand out" (p. 26) functions of emotions, also stating, "Emotion theory is also centred on the relationship between a person and the environment rather than environmental or intrapersonal events alone" (p. 40).

The debates between cognitive versus social constructionist perspectives of emotion are consistent with similar debates about the socio-cultural approach (for example Vygotsky and neo-

Vygotskian theorists) versus cognitive constructivist (deriving from Piaget) perspectives in education. In the classroom situation, the socio-cultural and cognitive constructivist perspectives of education are merging in the current socio-cognitive approaches to research on teaching and learning in the classroom. This possibly reflects an era of "rapprochement (in these) paradigm wars" (Gage, 1989, p. 10). The theoretical context of the classroom will be discussed following this section on emotion theory.

Feelings or Affects

Aristotle used the term "feelings" as part of his definition, as have Skinner, Lazarus and Strongman (above). Lazarus (1991) explains that the terms "feeling" and "emotion" are often used "interchangeably" (p. 57), rebuking himself for also doing so "a bit carelessly" (p. 57.) on occasion. Lazarus's view is that feelings are sensory perceptions and the term "feeling" should be used only to describe awareness of bodily sensations, while the term "emotion" should be used only when there has been an appraisal of harm or benefit. However if we accept a communication function of emotion, the feeling may actually be immediately labelled as the emotion. Averill and Nunley (1992) explain the relationship between emotions and feelings: "Feelings are simple sensory experiences...and within the broad domain of feelings, feelings of emotion may be simple sensations, vague bodily awarenesses, cognitive evaluations and motivational states" (p. 52). Averill and Nunley go on to explain that being emotional is different to feeling emotional, in that the former is experienced in the present, while the latter is a product of reflection, which may in turn be either correct or incorrect. These distinctions between actual and reflective emotional experience by Averill and Nunley are relevant to the use of self-report in emotion research. By its very nature of accessing the memory of an event, the reflection may recall or re-create the emotion accurately or differently to the reality as it was at the time. See Loftus (1992 and other publications) for a full critique of the accuracy of memory (Loftus, 1992).

From the biological perspective, Izard and Malatesta (1987) define emotion feeling as "the internal, subjectively experienced component that derives directly from the underlying neural and motor processes" (p.497). Izard and Malatesta explain that "affect" (p. 497) is a more general term, which includes emotions and physiological states. Under this definition, pain, thirst and hunger might be regarded as affects. For example, the affect of pain will include both the physiological drives and emotions. Therefore as a person is driven to move away from or tries to avoid the pain, emotions such as fear or anxiety might be associated with this (Izard & Malatesta,

1987). These biologically derived terms (affect and feeling) have since found their way into other discussion domains of emotion, with some common usage finding the terms used interchangeably. For example, the feeling or experiential component of emotion in general has been labelled "affect" (Frijda, Mesquita, Sonnemans, & Van Goozen, 1992, p. 195).

Mandler (1990) explains that "unfortunately (affect) has meant many things to many people, ranging from hot to cold interpretations" (p. 21). Similarly, "affective feelings are not beliefs" (Pugmire, 1998, p. 63), but this does not prevent them from being processed cognitively. Pugmire argues that by being "felt" (p. 63) emotions gain more properties than the associated thoughts or cognitions. Frijda et al (1992) succinctly link the terms "affect" and "emotion" in their definition of emotion as follows: "The word 'emotion' is usually reserved for unpremeditated affective reactions to significant events; an 'emotion' is a more or less unitary or elementary exemplar of such reactions" (p. 190). Isen (1990) appears to use the terms "affect" (p. 291) and "feelings" (p. 90, p. 296) interchangeably in her summary of work on the cognitive effects of happiness. In general, it appears that as the literature in mood and emotion has increased, there has been less use of the term "affect", although it can still be found.

The Physiology of Emotion

The inclusion of "feeling" and awareness in the above definitions confirms that there is a biological component in emotion. As Strongman (2003) points out "it is obvious...that bodily and neurophysiological reactions are involved in some basic way" (p. 72). Averill and Nunley (1992) state that they openly avoid discussing "in any detail the brain mechanisms that mediate emotion, for knowledge of such mechanisms is rapidly advancing, and hence quickly outdated" (p.xii). Lazarus (1991) sees the "perennial dilemma, namely, whether physiological activity is necessary to say that a person is experiencing an emotion" (p. 57). Due to the complexity of emotion and cognition with their neurological networks spread so widely over the central and peripheral neural pathways, Lazarus (1991) states, "In my opinion, it is difficult to argue convincingly for separate systems as though there were a special brain organ for each" (p. 179). There is a general consensus that despite the neuroscientific advances, "we are a long way from understanding" (p. 179) how specifically it all works. However, despite this, there are several existing theories relevant to my inquiry.

The first of these is the Hebb rule (1949), which hypothesises the neurological process by which classical conditioning occurs at the level of the neurons. The hypothesis is that if a specific synapse repeatedly becomes active at about the same time that the post synaptic neuron fires, chemical changes at the synapse will strengthen the post-synaptic connection. Neuropsychological research of the anatomy of classical conditioning (stimulus response learning) has shown the pattern of emotional responses organised by the amygdyla, following exposure to either conditioned or unconditioned aversive stimuli. When the central nucleus in the amygdyla is activated, other regions of the brain also trigger several behavioural, autonomic and endocrine responses. Carlson (1994) suggests that an important aspect of these aversive stimuli is that many of them are not intrinsically so. We have had to learn to fear them. Such conditioned emotion circuitry might then be incorporated in any current conscious or unconscious appraisal in the theories discussed above. This might be seen in phobias at one end of the continuum to simple dislike at the other. In the school context, emotional conditioning might explain why some children are happy to go to school and others are not.

The second potentially relevant finding relates to the ability of the limbic or emotion system to act rapidly and independently, without immediate conscious cognitive participation (Le Doux, 1998). According to Le Doux (1998), emotional processing via the limbic system can bypass the neocortex, taking the "low road [rather than the] high road" (p.106) to the amygdyla. Detailed research on the processing of fear responses to ambiguous auditory stimuli has shown a direct path between the sensory thalamus and the amygdyla, which then instantaneously prepares the body for responding. Only after such priming does the executive function of the cortex then evaluate the situation "to prevent the inappropriate response rather than produce the appropriate one" (Le Doux, 1998, p. 107). Other than unconsciously perceived emergencies, information from the sensory thalamus usually takes the "high road"(p.106) to the neocortex first, for rational decision making. Le Doux (1998) suggests that the direct pathway or "low road [might be] responsible for the control of emotional responses that we just don't understand" (p.106). Routinely taking this low road more may also be a factor in emotional disorders.

The amygdyla might become "a repository for memories and impressions that we have never known about in full awareness" (Goleman, 1995, p. 18), through the emotional conditioning process described above. In this way, the amygdyla may actually help retain unconscious emotional memories (Goleman, 1995). These memories may be instantaneously activated unconsciously as a "neural highjacking"(p. 14), without cognitive input. Such highjackings

might explain those moments in which any of us overact emotionally to a seemingly non-emotional situation. In such a situation, the "emotional architecture of the mind" (Greenspan, 1997, p. 13) system may be designing these responses.

The amygdyla is also implicated in "flashbulb memory", a term originally coined by Brown and Kulik (1977, p.73). Goleman (1995) suggests that in situations where strong emotional arousal might occur during an event, the amygdyla will assist the imprinting or vividness of the memory. Emotional system arousal stimulates the sympathetic nervous system which might prepare us for fight or flight, or might enhance the memory of a significant event - such as remembering where one was and what one was doing at the time of hearing of the death of JFK. A similar experience might occur when children have a fun learning experience of the alphabet from watching Sesame Street. Subsequent hearing of the familiar theme tune will assist retrieval of the concepts. In the classroom, anxiety responses may equally become conditioned inappropriately through an intense anxiety response occurring simultaneously with a routine event such as concept learning or other classroom experiences. Differences in these sorts of emotional conditioning might account for part of the variance in individual differences in observed emotion events and cognitive performance in the classroom. Any of the contextual stimuli may become associated with inappropriately conditioned "low road" (Le Doux, 1998, p. 109) responses and unconscious emotional memories. It has also been argued that "there may be no such thing as an emotionally neutral state...in learning or retrieving information" (Penner, Batsche, Knoff & Nelson, 1993, p. 54). In those extreme examples of children (or any of us) experiencing an angry or any intense emotional response overwhelming a rational response in a learning situation, an "emotional highjack" (Goleman, 1995, p. 17) might have occurred.

The intensity and nature of emotional conditioning have been shown to impact both storage and recall of new concepts in a learning situation (Mayer, McCormack & Strong, 1995). Their studies have shown that by deliberately creating an emotional memory or mood during learning, accessing the same mood again will assist the recall of the concept. (The term "mood" will be discussed shortly.) Mayer, McCormick and Strong (1995) have described this process as "mood-congruent memory" (p. 736). The hypothesis is that mood-congruent material, which matches a current mood - whether positive or negative, will be more readily accessed.

Schema theory is also relevant at this point, although it is referring to a cognitive construct rather than directly to physiology. In the conceptual change model of student learning, Pintrich, Marx

and Boyle (1993) cite individual differences in classroom contextual factors, and motivational beliefs, as possible reasons for students not activating their prior knowledge in learning situations. Prior knowledge may exist within a prevailing schema which the learner may bring to the classroom (Ellis, Varner, & Becker, 1993). Previous emotional or mood conditioning may be unconsciously incorporated in a learner's existing or prevailing schema, which might also include a negative or a positive expectation. For example, a student with a prevailing negative schema that expects failure and aversive outcomes may demonstrate poorer performance. Bower's (1981) network theory implies that emotional states are represented as nodes in memory, which are in turn linked to events in which a specific emotional state was aroused. Similarly, arousal can cue information that has a similar level of arousal in memory.

In the classroom, mood-congruent memories may exist within the prevailing schema in a student's existing knowledge. This may impact either recall of prior learning or encoding and integration of new learning within an existing concept schema. Anecdotally teachers try to establish children's prior knowledge, perhaps inadvertently activating negative emotions in the process. At other times, facing a maths book might immediately activate the classically conditioned negative emotion experienced last time the same book was opened.

These theories are closely related and potentially explain a variety of emotional responses that might occur in the classroom.

Developmental Aspects of Emotion

The biological development of the human emotion system is incorporated in the development of the nervous system. I have briefly addressed the biological components above as far as the specific structures in the brain, which are implicated in the central nervous system's role in emotion. The general category of an emotion system refers to the discrete emotions and their inter-relationships (Izard & Malatesta, 1987). Biologically these inter-relationships include neurophysiological (neurological and neuromuscular) and cognitive processes. Physiologically, an emotion comprises "neural, motor-expressive and mental processes or feelings" (p. 496). This biological categorisation fits nicely with Lazarus's (1991) cognitive-motivational-relational theory, and the three functions of the mind of motivation, cognition and emotion (Snow, Corno & Jackson, 1996). The biological complexities in the entwining of the emotion, endocrine, the

autonomic and somatic nervous systems can probably only be verbally captured in these tripartite ways.

Infant developmental research has contributed to our understandings of both the normative development of emotions and the many and varied individual differences that occur in this development. For example, it is generally-agreed that "innate emotion-specific neuromuscular patterns (facial expressions of emotions) show regularity in form and time of emergence and serve adaptive functions in development" (Izard & Malatesta, 1987, p. 508). The first emotions to be observed as facial expressions in infants include interest, disgust and physical distress, which are seen very early in the neo-nate - perhaps for survival purposes. There is debate as to when an infant is actually capable of her first social smile, with the agreed time frame ranging from three weeks to six weeks when she might be capable of recognising a specific human face. The relevance of these early developmental findings for my inquiry is that they confirm the role of specific antecedents and consequences for specific emotions in children.

Early emotional development is also addressed in various theories relating to the mother-child relationship and attachment (for example, Bowlby, 1951, Ainsworth, 1969). Lazarus (1991) acknowledges these and other theorists, arguing that "when all is said and done, learning is crucial to the emotion process" (p. 325). Irrespective of which of the learning theories one favours, children's cognitive development will be a key factor in applying Lazarus's theory. Lazarus (1991) explains that, "developmental changes in cognitive activity are important in respect to the way meaning, on which emotions depend, is generated, as well as in the social regulation of emotions" (p. 346). For example, children learn to label their emotion feelings in the first year of life, the speed at which they do so reflecting the amount of feedback they receive from their mothers or caregivers in labelling their emotions in their numerous interactions on a daily basis (Izard, & Malatesta, 1987). Once a child begins the process of labelling her emotions, the emotion-cognition relationship "is greatly accelerated" (Izard, & Malatesta, 1987, p.538). As the child develops, she will experience "countless adaptational encounters with the environment" (Lazarus, 1991, p. 346), in which the processes of appraisal and responding take place. The ongoing success or not of these adaptations will play an important role in shaping the way a person deals with their emotions. Concurrent labelling will also help create the emotion vocabulary.

Other developmental theory also assists our understandings of children's emotional development. For example, Erickson's (1995) "trust versus mistrust" (p. 222) stage acknowledges the reduction in anxiety when infants are securely attached to and learn to trust their caregivers. The children who were the subjects of my inquiry were aged between 9 and 11 years, perhaps on the cusp of Erickson's (1995) "industry versus inferiority" (p. 232) and "identity versus role confusion" (p.234) stages. Appropriate resolution of the former implies that they should have minimal anxiety and have the self-confidence to positively engage in their elementary school activities. Appropriate resolution of the latter is needed to reduce adolescent anguish. Therefore children's emotional experiences in the classroom must be valued and understood in the light of their developmental stage.

Stanley Greenspan (1997) offers a unique perspective on children's emotional development. Based on his many years' experience of working with and researching autistic children, he argues that "it is the absence of critical emotional experiences that is mostly responsible for the development of autistic symptoms"(Greenspan, 1997, p. 9). When autistic children have been provided with these necessary emotional experiences, many autistic children develop normally in both intelligence and emotion. Greenspan (1997) believes that emotions are more than just accompaniments or participants in children's cognitive development, they actually "create, organise, and orchestrate many of the mind's most important functions" (p. 7). He adds that academic abilities originate in our earliest and ongoing emotional experiences. In a similar perspective to Oatley and Johnson-Laird's (1998) communicative theory, Greenspan (1997) describes emotions as children's "discrimination meters" (p.24) in response to emotion cues from situation to situation.

Jenkins and Oatley (1998) have found that by the time children are five years old, their emotional responses to events can be observed. Within the context of psychopathology, they argue that rather than one single event, it may be repeated similar negative events that put a child at emotional risk. For example anger may be repeatedly experienced in situations of poverty. As a result, repeated frustration of goals due to lack of resources and opportunities may create a strong schema in a child that others will intentionally stop her from getting what she wants – or that other children actually get what this child herself might want. This schema is likely to also include negative emotions such as anger (as also referred to schema theory above). For example, how does a child feel when mythical Santa Claus delivers presents such as a bicycle - that she wanted - to wealthy families and not to her? In addition, children model and therefore learn the

negative appraisal processes of their parents. Further, when children live in a context of repeated or perpetual negative emotions they are likely to experience "emotional contagion" (Jenkins & Oatley, 1998, p. 51) through modelling the negative emotions around them. Transposing this example to the classroom, it may be predicted that repeated emotional experiences whether positive or negative on a daily basis will strengthen them through these sorts of processes. A further compounding effect may arise if children are making other negative self appraisals and attributions such as a negative belief of their self-efficacy (Bandura, 1997), or not seeking help from the teacher (Graham & Barker, 1990). On a more positive note, the process of emotional contagion also might work positively both ways in the classroom. For example a teacher's enthusiasm may stimulate excitement and positive emotions in students, "but having enthusiastic students in one's class may in turn fuel the teacher's enthusiasm in teaching this class" (Pekrun, Goetz, Titz, & Perry, 2002a, p. 102).

The children in my inquiry were in their 5th or 6th years of schooling. By this stage, they will have had at least four or five years' experience of being in the classroom environment, by which time they may already have well-established ways of responding emotionally, both generally and specifically to the classroom context. Jenkins and Oatley (1998) argue that "children develop biases of emotional responding ... because particular emotions are repeatedly elicited in their environment, and because certain emotional expressions serve a function in that environment" (p. 46). They use the term "emotion schema" (p. 46) to label this patterning of appraisal and emotional responses. This fits with cognitive theories such as Piaget (1952) and the physiological theories cited above. Their process by which biases are developed is also consistent with Lazarus's (1991) view of traits versus states, which will be discussed shortly.

Emotion Vocabulary

Emotion vocabulary refers to the words used to express the experience of emotion. Strongman (2003) points out that normally we use everyday language to think and talk about emotions. Frijda, Markam, Sato, and Wiers (1995) express a similar perspective stating that emotion "phenomena are complex, and when using words, individuals as well as languages take their pick in what they wish to designate in those complex phenomena" (p. 121). This has implications in applying the theories of both Lazarus and Oatley. In general, the words picked or selected by individuals to make their appraisals will reflect their unique everyday language skills and general vocabulary development. The more words or categories of description present in one's individual

vocabulary, the more distinctions possible for describing experience. For example, the poet Wordsworth "wandered lonely as a cloud" amongst the daffodils while another person might have simply said "I went on my own". Frijda et al (1995) see Lazarus's cognitive-motivational-relational theory actually reflected in emotion vocabulary. For example, feeling excitement indicates an action readiness to move or do something, while feeling apathy reflects non-action and submitting to events as they happen.

Several theorists identify two main emotion categories of emotions and emotion words - namely primary or basic emotions and secondary or derived emotions. The rationale behind primary emotions assumes that they are present at birth or within the first year, and that they are important in protective, reproductive, orientative and explorative adaptation (Lazarus, 1991). This is consistent with Izard and Malatesta's (1987) developmental theory on facial expression and their three early basic emotions described above. For example "a discrete emotion can be defined as a particular set of neural processes that lead to a specific expression and a corresponding specific feeling" (Izard & Malatesta, 1987, p. 494). Secondary emotions refer to combinations or blends of discrete or basic emotions, and also account for cultural and other differences. They also reflect "greater human cognitive and social complexity" (Lazarus, 1991, p. 81). The distinction between primary and secondary emotions is relevant to my research question mainly in understanding and coping with the variations in the vocabulary or lexicon of emotion. For example, depending on the individual child's cognitive development and the social context within which children have learned and developed their language skills, there may be individual differences in their specific emotion vocabularies. This might also extend to emotional awareness. For example, if emotions have not been labelled in earlier years, the emotion experience itself may not have been noticed.

In addition to the research on facial expression contributing to the understanding of specific different emotions, Izard and Malatesta (1987) also argue that these findings also confirm that emotions can operate separately from cognition. Some of the labels used in emotion terminology reflect the biological derivatives of emotion. Ekman and Friesen (1998) have proposed a similar set of primary emotions based on the assumption that there are specific neurophysiological structures and processes for emotion across the human species. Based on their extensive studies of universally-recognised facial expressions since 1987, Ekman and Friesen (1998) propose seven basic emotions namely; fear, anger, happiness, sadness, disgust, surprise, contempt. In comparison, Izard (1977) has proposed nine emotions including Ekman's seven, but using the

word joy rather than happiness, and with the addition of interest, and shame. Izard's (1977) list is similar to Tomkins (1981) who describes enjoyment and distress, rather than happiness or joy for the former, and sadness for the latter.

Oatley and Johnson-Laird (1998) explain that in their revised communicative theory of emotion, they have not included disgust. Oatley and Johnson-Laird (1998) cite their "big four" (p. 89) emotions of happiness, sadness, anger and fear. They now add a further set of biologically derived emotions such as those associated with attachment, which have specific objects. They also include a category of "mixed emotions" based on individuals making "more than one cognitive evaluation, and such evaluations can create distinct emotions in parallel or in rapid alternation" (Oatley & Johnson-Laird, 1998, p. 92). Mixed emotions will be discussed shortly.

Lazarus (1991) has provided a working list of four emotion categories, based on his cognitive-motivational-relational theory. His use of the term "working" acknowledges that Lazarus is open to reviewing this. The first category captures appraisals of goal-incongruence, which would result in the negative emotions of anger, fright-anxiety, guilt-shame, sadness and disgust. Goal-congruent or positive emotions are happiness/joy, pride, love/affection and relief. Borderline emotions include hope, compassion, and aesthetic emotions. Lazarus (1991) has a final category of non-emotions. Within his non-emotions, Lazarus includes ambiguous positive states (such as confidence, expansiveness and so on) and ambiguous negative states (such as frustration, disappointment). Lazarus (1991) has also identified pre-emotions which are not emotions but "cognitive states – namely interest, curiosity, amazement, alertness, and surprise – that appear to have some heat or arousal... that indicate a watching or waiting for evidence on which appraisal of personal significance depends" (p. 83).

Oatley (1992) has analysed the semantics of emotion words. He explains, "a word enables what has been experienced to be spoken of (and) when we use a word to refer to something, it points to a conceptual meaning" (p. 77). As noted above, if the individual child's developmental history has not acknowledged the experience of emotion, the concept itself may be difficult to label. As also shown earlier, the conceptual meaning of emotion varies across theorists, which may also be why emotion vocabulary itself has "grown up unsystematically" (Oatley, 1992, p. 77). Frijda Markam, Sato, and Wiers (1995) explain that the complexity of emotional phenomena is depicted in the diversity among the different emotion lexicons. For example they say that it is not possible

to "neatly map" (p. 121) emotion words across cultures and languages, despite the universality of emotion experience and expression found by Ekman and Friesen (1998).

The variations in the above categories and lists indicate that there is no single comprehensive dictate as to emotion vocabulary. Across the theorists mentioned so far, the four commonly agreed upon emotions are anger, fear, sadness and disgust. Several theorists – apart from Lazarus (1991), include interest as an emotion. As far as which emotions are included, Ortony and Turner (1990) argue that categorising specific emotions as basic, does not allow for emotional diversity, and might actually limit the study of emotions. As noted by Izard, Kagan and Zajonic (1984), if interest is excluded from the definition of emotion, surprise and boredom would then likely be excluded. From Libby's descriptions at the beginning of this thesis, boredom is salient enough to need to be included for this inquiry.

While the theoretical perspective for my inquiry has drawn mainly on Lazarus and Oatley, in fully exploring the emotion experience of the children in this study, this investigation has not been limited to the categories and vocabularies of these two theorists solely. This partly reflects the anticipated individual differences in children's language development, let alone their emotion vocabulary development. Drawing on the procedural questioning methodology, Oatley (1992) suggests, "The first question one can ask about a potential emotion term is whether it can be used to refer to a feeling" (p. 79). It would be unlikely that children answering Oatley's suggested question, would limit their vocabulary solely to those on any of the lists discussed in this section. For example, we might predict that interest and boredom are likely to be reported. It is also interesting that when comparing existing vocabulary lists to self-generated vocabularies there is evidence that the fixed choice paradigm (Rosenberg & Ekman, 1995) accurately reflects the verbal categories people use when they have free choice as to labelling. This suggests that despite the diverse opinion it should be possible to communicate with subjects about their emotions using some sort of shared vocabulary.

Finally on the subject of vocabulary, consistent with Lazarus's (1991) strong position on context, the emotion vocabulary for my research question should reflect the school or academic context

Dimensions of Emotion

One of the issues raised by considering vocabulary categories of emotions, is that each of the emotions themselves may be considered as a single category (Lazarus, 1991). Each of these individual emotion categories may in turn be "dimensionalised on the basis of their within-category strength" (p. 59). For example annoyance, "which is a relatively mild anger ...[may be] distinguished from rage, which is an intense anger" (Lazarus, 1991, p. 59). Lazarus points out that this is not the dimensional perspective as found through factor analysis, about which he has reservations. According to Lazarus, reducing the vocabulary of emotions through factor analysis "loses important relational meanings inherent in our rich vocabulary of emotions" (p. 84). However factor analysis may have "merit in simplifying generalisations ... and merit in merely trying to reduce redundancy" (p. 62). As Lazarus also points out, the specific methodologies and analyses used will influence the dimensions found. For example, unless they take account of the emotion-generating conditions at the time, then the emotions under discussion will be treated inadequately. As an example, Lazarus (1991) cites the findings of Diener, Sandvik and Pavot (1989) from their research on happiness using scales to indicate the frequency and intensity of positive and negative well being over a six-week time frame. Lazarus finds that these sorts of data do not really answer the question about daily emotion. He argues that using the cognitive motivational relational theory, subjective well being is a product of ongoing appraisals. Appraisals of specific adaptational encounters during the time frame of the globally reported well being may show more variation in emotion than might be assumed in the aggregated method. This perspective is relevant for my research question, in both the methodology and the reporting of the results. More recent findings of Scollon, Diener, Oishi and Biswas-Diener (2005) will be reported in the literature review.

Mixed Feelings and Ambivalence

Within his category of complex states above, Lazarus (1991) has referred to ambiguous states generally in terms of mixed emotions of the same negative or positive valence. He also includes a category of "functional mental confusion" (p. 83), the most common two being bewilderment and confusion. Lazarus argues that these two states will have emotional correlates without being emotions themselves. Rather than ambivalent emotions, Lazarus explains a process of mixed or ambivalent states of mind. For example, if someone is feeling happy as the result of good fortune, that person might also feel guilty that it occurred, or anxious that it might not last. Therefore the

state of happiness "is in some degree muted" (p. 267). Oatley and Johnson-Laird's (1998) view also relates to the role of cognitive evaluations in mixed emotions, as follows:

> In our original theory we allowed that mixed emotions could occur but thought that one emotion mode would tend to inhibit others. Hence mixtures should be ephemeral. The evidence shows this was wrong. A plausible revision of the theory is that individuals can react to events by making more than one cognitive evaluation, and such evaluations can create distinct emotions in parallel or in rapid alternation (p. 92).

This analysis indicates that the cognitive appraisal might occur either simultaneously or in rapid succession. Oatley and Johnson-Laird (1998) explain that the processing of more than one cognitive evaluation of a single event "calls for processing at a relatively high level in mental architecture. We can postulate that mixed feelings would not occur without knowing something about their cause" (Oatley & Johnson-Laird, 1998, p. 93). Mixed emotions might also arise from secondary evaluations. For example, a primary evaluation might evoke an emotion. Secondary evaluations about what to do about the situation might evoke new emotions about the original one. For example, Oatley and Duncan (1992, in Oatley & Johnson-Laird, 1998) found examples such as guilt about being angry and anger with the self about being fearful.

In an earlier publication, Oatley and Jenkins (1996) defined ambivalence as "having two conflicting emotions at the same time" (p. 186). They also argue that recognition of ambivalence is an important step in understanding the multiple goals that people have in everyday life. Most of the research findings on ambivalence derive from developmental research. For example, Oatley and Johnson-Laird (1998) cite the research findings of Harris (1989, in Oatley & Johnson-Laird, 1998) in which children's reactions to the story of a lost dog returning with a wounded ear, demonstrated age-related development of ambivalence. Relevant literature findings on children's ambivalence will be presented in the literature review (Chapter Three).

Relating back to Oatley's work on semantics, he comments ironically that:

> Granted the existence of stable mixtures, it is perhaps surprising how few words in English denote mixed emotions. In the everyday conception of emotions we have a natural grasp of distinct emotions and generally refer to mixtures by indicating the emotions that occur in them (Oatley & Johnson-Laird, 1998, p. 93).

The tendency to use the individual or distinct emotion words might support the argument for a limited number of basic emotions. More recently, this debate has re-surfaced along with findings of mixed or blended emotions identified through the experience sampling method (Zelenski & Larsen, 2000). Findings from experience sampling methodologies relevant to my research question will be presented shortly in the literature review.

Emotions or Moods

There seem to be two main characteristics identified by theorists when comparing the experiential aspects of emotion and mood. These tend to be in the descriptions of the intensity and duration of the emotion experience. There does seem to be agreement that emotion and mood have the same biological and cognitive origins. For example, Lazarus (1991) regards emotion and mood as essentially the same. He explains that "although the *feel* of an acute emotion and that of a mood are quite different, there are a number of difficulties in making a viable distinction between them" (p. 47). He elaborates further:

> In any case I am inclined to interpret *both* moods and acute emotions as reactions to the way one appraises relationships with the environment; moods refer to the larger pervasive, existential issues of one's life, whereas acute emotions refer to an immediate piece of business, a specific and relatively narrow goal in an adaptational encounter with the environment.....Though the temporal focus and perhaps the subject matter are different in each, both acute emotions and moods are reactions to appraisals about our well-being (Lazarus, 1991, p. 48).

While Lazarus (1991) has implied a temporal or time span difference when comparing mood and emotion, he also argues that if moods were to be distinguished on the basis of duration, this would not accommodate moods of shorter duration.

Oatley (1992) regards moods as emotional in that they are based on exactly the same kinds of readiness as emotion. Oatley (1992) describes moods as "maintained states" (p. 64). They also "do not have the "compulsiveness of an emotion episode (and may be) punctuated by waves of more distinct emotions" (Oatley & Johnson-Laird, 1987, p. 24). For example while remaining sad, a person may experience episodes of anger or even happiness. People can experience moods lasting as long as years such as in the sadness of bereavement. Oatley cites earlier findings that 33% of happiness, sadness or anger episodes lasted 5 minutes or less, 34% lasted 5 to 30 minutes

and 33% lasted longer than 30 minutes, a few of these actually bridged sleep. The duration of the emotion will depend on the importance of the issue and whether it is resolved.

Moods may filter one's appraisal of the world as a whole, as a global perspective (Frijda, Mesquita, Sonnemans & Van Goozen, 1992). Extremely long lasting low moods will eventually be regarded as depression and necessitate treatment. Oatley (1992) argues that in being maintained states, moods are actually resistant to change. Oatley and Nundy (1996) explain:

> Whereas episodes of emotion are associated with changing from one sequence of actions to another, as when a child becomes angry when reprimanded, moods are sustained emotional states that resist intrusion of events incompatible with them. When anxious children do not attend to anything except the concerns of their anxiety (p. 258).

Other research confirms the attention effects of anxiety such as intrusive thoughts (for example, Ellis Varner & Becker, 1993) and the treatment for depression through cognitive therapy (Beck, 1987). It is beyond the scope of my thesis to go into any more detail here.

Other distinguishing characteristics of moods include a general unawareness of how the state started (Oatley, 1992), or that they have a "distinct emotional quality ...[but] without specific object" (Frijda et al, 1992, p. 220). Alternatively, the object of the mood may no longer be relevant. For example a person in a sad mood may know what initially caused the mood, and while remaining sad, may not be sad specifically about that original cause.

When discussing emotions as opposed to moods, Oatley (1992) also explains that emotions themselves also have quantitative dimensions, specifically of time and intensity. "An emotion may start suddenly or slowly and decay either fast or slowly. An interval between an emotion eliciting event and the start of an emotion may vary" (Oatley, 1992, p. 23). The delayed effect may indicate that an unconscious emotion system response has finally communicated itself, or that the person has had time to think about the event, and appraise the impact.

Lazarus (1991) comments that, "although both depend on appraisal, acute emotion is a response to an adaptational encounter, mood to an existential state or condition of life" (p. 266). Lazarus acknowledges (for example) that happiness can appear to be a stable trait, which moderates negative emotions - as has been found in the subjective well being research (Strack, Argyle &

Scwhartz, 1991). This is consistent with the views of Oatley (1992) above, and is also consistent with Isen's (1990) findings on the effect of positive mood on cognition. However, Lazarus (1991) does caution that if the occurrence of moods were to be interpreted as a personality trait or disposition, this would be "dangerous" (p. 47). He is adamant that mood should not be considered as a personality trait. For example, if someone is in an irritable or hostile mood, this does not necessarily describe her or his personality. What it means is that for the duration of the negative mood, something in the environment and not a personality trait "is putting this individual in a foul mood" (Lazarus, 1991, p. 48). Even if some people do seem to have a "melancholy or cheerful disposition" (p. 48), most people can and do experience positive and negative moods at various times.

This has implications for the classroom. For example, just being in class day after day might bring on a low mood, such as being bored as expressed by Libby in the opening words of my thesis. If there is something about school that perpetuates boredom for a child like Libby, this needs to be part of the exploration of the role of emotion. Children spend long hours and long years of their life span in school. For example, Oatley and Nundy (1996) reported that school children in Minnesota spend 1044 hours a year in school, 668 hours of which is scheduled for academic work. Multiplied by 13 or 15 times this is significant, which makes it important to be clear about whether children's emotions in school are personality traits or the result of environmental variables. For example, a trait approach will place the onus of feeling positive on the child or learner, whereas an environmental approach will redirect attention to classroom contexts and pedagogy.

In summary, the examples presented above comparing mood and emotion illustrate the potential for these two terms to be confused and used interchangeably. For the purposes of my research question, the key factors in common are that both refer to the emotion system, they both comprise emotion system responses to cognitive appraisals (either conscious or unconscious) and they both have the potential to enhance or interrupt cognitive processing and learning. The other important distinction relates to the potential risk for an individual to be labelled according to any specific persistent mood they might exhibit. For example, referring to an individual child as a happy child or an angry child. For the purposes of my research question we need to clarify how persistent moods such as feeling happy, angry or bored (Libby), do not reflect a personality problem. Lazarus (1991) has been helpful in identifying this potential risk, which we shall explore further in the next section.

Emotion Trait or State

The term "trait" is generally used to refer to distinguishing characteristics of a person. In the nature-nurture debate, physical traits such as height are regarded as highly heritable, but have been shown to still be subject to environmental modification (Wade & Tavris, 1993). Psychological traits are more complex than physical traits, and have been explored mainly in the domain of personality research, a simple definition of "trait" being "a descriptive characteristic of an individual, assumed to be stable across situations" (Wade & Tavris, 1993, p. 415). Snow, Corno and Jackson (1996) explain that a trait is an "individual difference construct that is interpreted to be relatively enduring and stable over time, and to apply to a relatively broad range of situations" (p. 480). Snow et al (1996) find that as long as these interpretations are made in relation to defined situations, making assumptions about traits is usually "not troublesome" (p.249). But they also acknowledge that using this terminology implies that the characteristic is "general, constant and inherited" (p.249) and when it comes to assuming dispositional, ability or intelligence (I.Q.) traits, they become "reified (as) a thing in the head" (p. 249). This creates the potential for individuals to be labelled in certain ways. For example if I.Q. is regarded as a trait that is as enduring or as constant as eye colour, why do anything to change it? If it endures across a range of situations, why change the situation? This is an important issue for the education context.

Lazarus (1991) views states and traits as "two sides of the same coin - when stability is high, the focus is on trait and state recedes in importance; when instability is high, the focus is on state and trait recedes in importance. Clinical work is centred on unwanted emotional traits" (p. 47). Lazarus (1991) compares the concept of an emotion trait to traits in general to sentiments or attitudes, which are not emotions as such but dispositions towards emotions. For example, when individuals experience the same emotion on a recurring basis, there is a tendency to regard these individuals as (for example) happy or angry persons. However, these recurrences or patterns of recurrences more accurately reflect their responses to the environment. Lazarus cites the example of a person who might be described as an angry person. This person may be angry more frequently than most, but this might reflect the environmental conditions. In addition, each episode of anger will be similar yet different depending on the specific context at the time. Therefore Lazarus (1991) explains trait emotion as "a prediction about the frequency, intensity or environmental contexts in which a particular individual is likely to experience a given emotional state" (p. 175). For example a child who is always happy at school may be demonstrating that this

context always induces happiness. A child who is regularly bored may be reflecting the regular lack of stimulation and interest in the environment. From Lazarus's perspective, addressing the context features of repeated apparently negative trait findings will assist in classifying environments on the basis of the emotions they induce. Although qualifying emotion generalisations with contextual variables is more complicated, Lazarus (1991) believes that this "increases our ability to explain and predict the inter- and intra-individual variations" (p. 176).

Snow, Corno and Jackson (1996) share the view that traits attempt to define an average or typical response for a class of situation. Trait measurements sum up some aspects of the person's learning history in particular situations, and offer a prediction about the person's behaviour in similar situations in the future. In contrast, Snow et al (1996) define states as momentary reports about "how I feel now in this situation"(p. 251). States may be measured with a few simple and direct on the spot questions and they will fluctuate within-person, from day to day, even from minute to minute, as well as from situation to situation. Similar to Lazarus (1991), Snow Corno and Jackson (1996) view states and traits as related, "State intensity may often be some multiplicative function of situational stimulus strength and typical trait level" (p. 251).

For the purposes of my inquiry, state emotion data is likely to be elicited when asking the children how they might be feeling either at the time of task engagement or retrospectively. Trait emotion data might be assumed if that child tends to report similar emotions each time. For example, Libby's description of her week was actually in response to a question about whether she liked anything about school. From her apparent persistent experience of boredom that might be inferred from this brief conversation, she might appear to be a bored child. She might be anecdotally labelled as a bored child. The hypothesis that some individuals might have a tendency to be usually bored or prone to being bored has been addressed in a series of studies. A number of measurement tools have been designed to assess the hypothesised trait of "boredom proneness" (Farmer & Sundberg, 1986, p. 4), yet researchers in the boredom proneness field still acknowledge that we need to consider the state or situational aspects of boredom. Therefore when analysing the experiences of the subjects in my inquiry, specific attention will be given to the debate of state versus trait as the need arises. As noted above, the former perspective directs our attention to the child in her context, while the latter lets us off the hook because we direct the responsibility for that child's boredom (for example) to the child herself.

Summing up the Theoretical Perspectives of Emotion

This section has included brief discussion on the aspects of emotion theory relevant to my inquiry. Relevant aspects of the theories of mainly Lazarus (1991) and Oatley (1992) have been compared and contrasted with each other and with other theories as appropriate. It is not possible to consider emotions without acknowledging the complexity and diversity both across and within the many theories. Most aspects of emotion theory are not finite and continue to be fully open to debate. The cognitive-motivational-relational theory of Lazarus (1991) and the various aspects of theory - particularly the communicative model, presented by Oatley and Johnson-Laird (1998) lend themselves to considering and investigating emotion in relation to the school context. They both acknowledge the importance of context in relation to appraisal and emotion responses. They also both acknowledge that there will be a learning history associated with emotions in specific contexts.

The underlying processes of mood and emotion may be regarded as the same emotion system process, allowing for some qualitative and quantitative differences. Emotions and moods may be called feelings or affects, and most of the important information about them can only be obtained through a person's self report. Observation data might validate this, but if we cannot ask a person about their own emotions, or their perception of how they are feeling, there may be no point researching emotions.

Context is a very important variable. Children spend years in school contexts. By the time they leave school, they will have appraised and emotionally responded to thousands of mainly repetitious and - maybe only a few - unique events. Anecdotally we know that children frequently leave school wearing a trait label of "lazy" or "unmotivated" or "sullen" or "angry" or "happy" or "delightful" and so on. Lazarus (1991) is very clear about how such traits emerge and what story they might actually tell. They more likely reflect the repetitiousness of the types of events and contexts that elicit these emotions. Observation data will be useful in demonstrating the classroom contexts, their antecedents and any specific emotion events, as an objective perspective in conjunction with the children's self-report.

Communicating with the children about their emotions will also rely on language and terminology. There seem to be a number of basic emotions or moods, although there is no single vocabulary as such. People may experience mixed emotions or ambivalent emotions, generally

identifying the individual components of these blends. Bearing in mind the developmental stage of the children studied in my inquiry, their cognitive and language development will determine how we shall talk with them about their emotions.

Issues Relating to Research

One of the difficulties resulting from the complexity of emotion theories and definitions, is how to determine the unit of analysis and variables of interest for research (Frijda et al., 1992). This difficulty is highlighted in exploratory research such as my inquiry, which was proposed as "Investigating the role of mood or emotion in children's learning task engagement in the elementary school classroom". Observation alone will not access the inner processes of the cognitive-motivational-relational process, nor the role of emotions as communicators. Ultimately there will be a need to ask the children about their experience and how they were actually feeling. Lazarus (1991) believes that field studies are more suited to the study of emotion. He also argues that "emotion draws on what is in the person and in the environment together as a complex relational unit – defined centrally not peripherally" (p. 432). For an in depth exploration of the emotion process using the structure of his cognitive-motivational-relational theory, Lazarus (1991) argues the need for including measures of the three components, namely the antecedent content variables (motives and beliefs), the mediating process (the appraisal process), and the response measures. Obtaining data on both Lazarus's observable and unobservable variables will require both observation and self-report methods.

A Working Definition of Emotion

For the purposes of my inquiry, emotion is treated as a central component in an entwined dynamic response system sensitive to the context, and often able to respond more quickly than cognition. It varies as goals and priorities vary and if elicited in similar situations repeatedly, an emotion will have been learned as a bias or more commonly used way of responding. Moods and emotions are treated the same in this study - basically as how the children are feeling. For the purposes of my research, whether the child is experiencing a mood or an emotion is *less* important than *what* emotion or mood she is feeling. For example, if a child is in a maintained mood state or an acute immediate emotional state, this will still denote the status of her emotional system at that moment under investigation. For example, classroom activities may have no impact

on an existing mood or they may be associated with or elicit a strong emotion. Either way, the purpose of my research is to find out what emotions or moods are experienced.

The most direct way to obtain self-reports from the children about their emotions or moods will be to simply ask how they might be feeling. Lazarus and Oatley, as well as others discussed have indicated that the word "feeling" (Lazarus, 1991, p. 57) taps into the experiential component of emotion. Lazarus (1991) has also stated that emotions "are a valuable source of information about persons and how they are getting along in their worlds" (p. 40). Asking the children how they are feeling should also be an efficient method of diagnosing how they are experiencing their classroom world. The children's answers as to how they are feeling will provide valuable information about how they are "getting along" (Lazarus, 1991, p. 40) in the classroom. Irrespective of whether using fixed choice (Rosenberg & Ekman, 1995) and self-generated vocabularies, this question can be asked either on the spot or retrospectively.

Therefore the working definition of emotion for my research question is, "how the child is feeling" Having received the answer to this question, the cognitive appraisals and other unobservable variables can then be explored. The next section will briefly address the theoretical perspective of the research context – the constructivist classroom.

Section Two: The Constructivist Classroom

The previous discussion (Section One) has identified context as an important variable in a child's experience of emotion or mood. Specific contexts might provide specific antecedents to emotion and these antecedents might be appraised and/or responded to either consciously or unconsciously. My research question was specific about the types of contexts within which children's moods or emotions were to be investigated. The broader context is that of the elementary school classroom. Within the classroom, the teacher designs activities or tasks for the children to do. These tasks create specific shorter- or longer-term and changing contexts for learning. Tasks may also include other children thereby introducing a social context as well. The classroom itself is also part of a wider school, community and government policy-driven context, but a detailed critique of these "outside-classroom" contexts is beyond the scope of this work. However, relevant issues will be identified as they arise. The classrooms used for my inquiry are broadly categorised as constructivist (Palincsar 1998), because my research was conducted within the research context of the Project on Learning (Nuthall, 2002). The core aims of the Project on

Learning were consistent with the constructivist perspective in contemporary education research and reform efforts, designed to encourage students to assume a more active role in their learning (Palincsar, 1998; Hickey, 1997).

Just as emotion remains the subject of ongoing debate and modification, so too does the concept of the constructivist classroom. This section will commence with a brief summary of the constructivist perspective in general, and how this relates to knowledge and learning. The theories of Piaget and Vygotsky will then be briefly reviewed before coming back to the socio-cognitive perspective of learning, which draws on both theorists. Finally, the transactional model of learning proposed by Nuthall (1999) will be considered in relation to the hypothesised role of mood or emotion in children's learning task engagement in the elementary classroom.

Constructivism is a widely used term, originally derived from Piaget's (1952) theory that learning is achieved by children actively constructing their own knowledge (Palincsar, 1998; Smith, 1998; Windschitl, 1999). Rather than solely explaining an educational or learning theory, the term constructivism also constitutes a "worldview" (Lapadat, 2000, p. 2). Constructivism reflects a postmodern paradigm, "with its emphasis on the social construction of social reality, fluid as opposed to fixed identities of the self, and the partiality of all truths" (Lincoln & Guba, 2000, p. 178). Constructivists are perceived as "tending towards the antifoundational [which means that they] refuse to adopt any permanent unwavering standards by which the truth can be universally known" (p. 178). The disadvantage of such an open perspective might make it difficult to pin postmodern constructivists down on any issue. Also, using such labels implies that these categories have been defined and that all who use the category labels share the same understanding of what they mean, which is not necessarily the case. For example, while Lazarus's (1991) theory of emotion may be considered as consistent with the postmodern paradigm, he explains that he resists "the temptation to refer to what is being called postmodern, which seems to me to be an oxymoron" (Lazarus, 1991, p. 27).

Generally in the education domain, the constructivist perspective holds that knowledge construction is "entirely internal – internal to the minds of individual students under most construals, or internal to the distributed cognition of the classroom community under construals influenced by socio-cultural theories" (Bereiter, 1997, p. 296). Central to cognitive constructivist perspectives is the view "that students construct their own knowledge" (Nuthall & Alton-Lee, 1997). Palincsar (1998) argues that all cognitive theories are constructivist to the extent that

"cognitive structures are typically viewed as individually constructed in the process of interpreting experiences in particular contexts" (p. 347). Within the classroom research literature, constructivist perspectives are generally described in overview statements for example, "advocat[ing] teachers fostering learning by engaging students in building and restructuring explanations of the world around them" (Crawford, Krajcik, & Marx, 1999, p. 702); or "premised on the belief that learners actively create, interpret and reorganise knowledge in individual ways" (Windschitl, 1999, p. 752). A common theme across this sample of definitions is students' knowledge construction. Greeno, Collins and Resnick (1996) state that "the main reason for schooling is that students should increase in what they know. But, what is knowing?" (p. 17).

Greeno et al (1996) see the "nature of knowing" (p. 17) and the nature of "learning and transfer" (p. 21) as two important thematic issues in the theory of cognition and learning. Different theoretical perspectives will define these differently. They have grouped the main theoretical perspectives into three useful sets, namely the behaviourist/empiricist view, the cognitive/rationalist view and the situative/pragmatist-sociohistoric view. Each of these views is distinctly different, yet they complement each other (Greeno, Collins, & Resnick, 1996). From the behaviourist/empiricist perspective, knowing is "having associations (such as) stimulus-response associations" (p. 17), this perspective being applied in behavioural objectives in schooling. This perspective also includes the neural network approach which "characterise(s) knowing in terms of patterns of activation of units that excite or inhibit each other" (p. 16). This perspective is consistent with the Hebb rule (1949) discussed previously and the classical conditioning of emotions. From the cognitive/rationalist perspective, knowing is "having structures of information and processes that recognise and construct patterns of symbols in order to understand concepts" (Greeno et al, 1996, p. 18). This perspective fits with schema theory, Piaget's (1952) cognitive development theory and the conceptual change model of learning as just three examples. From the situative/pragmatist-sociohistoric perspective, knowing is "distributed in the world among individuals, the tools, artefacts, books that they use, and the communities and practices in which they participate" (Greeno et al, 1996, p. 20). This perspective relates to the individual learner, and will reflect the individual differences in each learner's response to the context. However it also incorporates the tools and artefacts of communities, consistent with the socio-cultural learning theory of Vygotsky (1981).

Each of the three perspectives above (Greeno et al., 1996) also provides distinct and complementary perspectives on learning and transfer. Generally learning may be regarded as "the

process by which knowledge is increased or modified. Transfer is the process of applying knowledge in new situations" (Greeno et al, 1996, p. 21). Behavioural definitions of learning include classical conditioning, through which positive reinforcement strengthens the desired behavioural response, as but one example of its application. Behavioural approaches to teaching acknowledge the importance of antecedents and consequences of behaviours, the need for shaping and fading the desired behaviours, through appropriate reinforcement schedules and so on. Transfer or generalisation under this behavioural approach is generally through similarity of stimuli, or through "gradients of similarity" (p. 22) of stimuli. Difficulties will arise for the learner if the stimulus is totally new, of course. In the classroom an example of *under*-generalisation might occur when a student learns a theory and passes the test on it, but cannot apply the theory to any examples, other than what was learned from the text book (Baldwin & Baldwin, 1986). *Over*-generalisation might occur when a child has learnt to obey the teacher, and then "uncritically obey(s) the teacher even when the teacher is requesting unusual behaviour, such as in the case of child sexual abuse in pre-schools" (p. 76). As noted by Lazarus (1991), environments provide many antecedents to emotion-related appraisals. Greeno et al (1996) also confirm that emotional conditioning might occur during the learning process:

> Affective responses ... [such as] students' experiences of either pleasure and satisfaction or embarrassment and humiliation are likely to become conditioned to stimuli in the circumstances of their learning, thereby shaping students' future affective responses to the situations of school learning (p. 21).

The cognitive/rationalist view describes learning as "acquiring and using conceptual and cognitive structures" (p. 22). Greeno et al (1996) place this area in the frame of "constructivism, the assumption that understanding is gained by an active process of construction" (p. 22). Examples of classroom research from this perspective cited by Greeno et al (1996) range from discourse about the meanings of concepts, problem solving, to information processing models. From the cognitive perspective, transfer should occur through application of the mental structures or schemata (singular = schema). However, the way in which problems are presented will determine whether an existing schema can actually be applied (Greeno et al., 1996). For example, from the research cited on problem solving, "there is evidence that the general schema has to be acquired in the initial learning" (p. 23).

Finally, from the situative/pragmatist-sociohistoric view, if knowing is viewed as "practices of communities and the abilities of individuals to participate, then learning is the strengthening of

those practices and participatory abilities" (Greeno et al, 1996, p. 23). Apprenticeship training is cited as an example of learning from this perspective. However the apprenticeship model could also fit the behavioural perspective. This situative perspective also relies on affordances within the context. Greeno et al. (1996) have suggested that transfer is "problematic" (p. 24) in this perspective. Of these three perspectives, the cognitive definitions of knowing and learning appear to immediately apply to the constructivist approach. However, irrespective of which approach is adopted, it is likely that some classical conditioning – particularly of emotions, will occur. Similarly each individual will bring her unique conditioning history and sociohistoric responses to particular contexts.

Bereiter (1997) expresses a similar opinion to Greeno et al (1996) on the shortcomings of context specific learning. For example he asks, "Can there be nonsituated cognition" (Bereiter, 1997, p. 284)? He then answers that yes there can be. Similar to Greeno et al (1996) he sees the limitations of situatedness as being a problem of transferability.

> What we learn in one situation, we often fail to apply in another. Situativity theory helps us explain why this is so. The progress of situated learning consists of increasingly fine attunement to the constraints and affordances of the particular situation. Thus as learning proceeds it tends to become less and less generalizable to other situations (Bereiter, 1997, p. 287).

Bereiter (1997) offers an example of a person learning a new job in a specific retail context, where some - but not all - of the skills and activities may be generalised to other retail contexts. However, as time goes by and a person gains further expertise within their specific context, there will be less that can be transferred or generalised. He also cautions that the longer that situatedly successful learning continues, the more need there will be for overcoming (or unlearning perhaps) some of these learned skills, when proceeding to a different context. For example, anecdotal evidence from the tertiary setting, is that students who have "grown up" in the transmission model of education, find it very difficult to *un*learn relying on their lecturers to provide the answers to every question. In the classroom context, Bereiter's issue of difficulties of transfer might be relevant in the two topic studies of the Aztecs and Space, which were two units of learning undertaken during my research project. The specific content or knowledge from these two topics may not have been particularly relevant to the children's lives outside of that specific context. However, the research processes - if learned as intended by the teachers – might well be transferable.

Another problem with contextual theories in education identified by Bereiter (1997), is that despite the amount of attention given to contextual learning by situated cognition researchers, "they have not come up with anything that could be called a new educational vision" (p. 295). I am less inclined to concur with Bereiter (1997) on his latter point. The contextual learning approach in itself is a new educational vision, which can draw attention to the interactions or transactions (Nuthall, 1999) between the learner and the context. My inquiry will be paying attention to this interface. Bereiter's (1997) comment perhaps reflects the challenge that has occurred by directing our general vision or attention in this new direction. His comment is also perhaps indicative of the difficulties associated with the "antifoundationalist" (Lincoln & Guba, 2000, p. 178) aspects of constructivism mentioned at the start of this section. It also reflects the difficulties inherent in trying to observe any learning process. Can this internal process be witnessed?

Lapadat (2000) identifies three types of constructivist teaching practice in the science classroom. Firstly, the mechanistic approach derives from the earlier transmission model of teaching through which the teacher imparts information and the learners are assumed to have learned by this very transmission. The constructivist perspective extends this mechanistic approach to accommodate students' prior knowledge, motivation and learning strategies and so on. Secondly, the organismic or radical constructivist approach (Lapadat, 2000) allows each individual to have their concepts and constructions of truth centred within the self. Classroom practice under this model would allow each student to develop their own theory of truth, and they would be assessed on their processes rather than what truth they found. The third constructivist approach derives from Dewey's contextualism (Lapadat, 2000, p. 12). Contextualism accepts a transactional theory of truth, with students' understanding being situated in context, and changing as the context changes. Of the three categories identified by Lapadat (2000), the extended mechanistic constructivist perspective implies that more is needed than just the immediate construction of knowledge in the present context. In identifying prior knowledge that requires building on, this implies that there is a specific knowledge agenda to be learned. This makes sense of course, because each knowledge domain has its own knowledge content and structure. This leads to the difficulty identified above of how to determine whether and what knowledge has been gained. This is but one of the many difficulties faced by teachers in creating and "sustaining a constructivist classroom culture" (Windschitl, 1999, p. 751).

From the practical perspective of translating constructivist perspectives into specific teaching and learning strategies, Lapadat (2000) found that it was actually difficult to implement constructivist teaching practice. Difficulties included students' questions frequently relating to rote learning outcomes based on years of conditioning as to what is expected in the classroom, and the traditional methods of interaction that teachers resort to when their own subject knowledge or overall background in the specialist area is weak (Lapadat, 2000). Windschitl (1999) agrees that that constructivist teaching methods "place high demands on the teacher's subject matter understanding" (p. 754). This applies not only in terms of the underlying principles of a specific domain of knowledge, but also in the need to be flexible about the ways the underlying principles can be explored. The consequence of allowing this type of flexibility then has further consequences for learning task design and assessment of what has been learned.

Anecdotally, this is the dilemma reported by classroom teachers, including those participating in this research project. For example, teachers who struggle with maths may not able to be creative in designing games or activities to support individual children's learning of difficult maths concepts. While there might be such products commercially available, they will not necessarily cater for the individual differences in children's prior knowledge and skills. In addition, although individual teachers might espouse constructivist perspectives, teachers are accountable to their schools and stakeholders, through curriculum and assessment policies amongst the numerous other requirements they are expected to meet. Curriculum outcomes may frequently require students to gain knowledge that may or may not have any relation to either their classroom context or their lives (as perceived at that time). In the classroom context, curriculum outcomes are generally incorporated within learning tasks and activities, tasks being regarded as the primary vehicles used by teachers for engaging students in the curriculum (Blumenfield, Mergendoller, & Swathert, 1987). For example, the average student will be assigned approximately 20,000 learning tasks during their school career (Fisher & Hiebert, 1990).

The challenge for constructivist teachers is that "constructivism cannot make its appearance in the classroom as a set of isolated instructional methods grafted onto otherwise traditional teaching techniques" (Windschitl, 1999, p. 751). For example, if the only practical constructivist-type process in the classroom is found in classroom tasks, while the assessment outcomes mainly reflect the mechanistic transmission model of teaching and learning, those classroom tasks will be basically irrelevant. Further, the student's active participation will also be irrelevant. Even more importantly anecdotal evidence suggests that students realise this too.

As noted earlier, the children in this research project were aged between 9 and 11 years 6 months. As also noted, their cognitive development is an important variable in understanding not only their knowledge construction and learning or internalisation processes but also their emotional responses in adaptational encounters. Their individual stage of cognitive development will be a factor in their cognitive appraisals in Lazarus's (1991) cognitive-motivational-relational theory. Piaget (1952) proposed that cognitive development proceeds through universal stages, through which each child must go in a "predetermined sequence" (Morss, 1991, p. 10). The children in this research project might fall within Piaget's concrete operational stage, which lasts from approximately 7 – 11 years of age, or the formal operational stage, which appears between the ages of 11 and 15 years. This implies a wide range of cognitive competence across the classroom, with some children relying on specific or concrete examples in order to perform concrete operations and logical reasoning, and others being able to think in more abstract terms. This will have practical implications when teaching for knowledge construction. For example Shayer (2003) tested 14,000 children between the ages of 10 and 16 years, using Piagetian assessment tasks. They found that "the range of mental development in any one year group is far, far wider than anyone dreamed, as those teaching in Comprehensive schools have learned empirically the hard way" (p. 468). For example comparing two sets of data for 14-year-olds taken from 1974/75 data and their more recent data collected during the year 2000, Shayer (2003) demonstrated a 12-year gap between concrete operational and formal operational levels in both sets of data. Shayer (2003) sums these findings up stating, "Any Year 7 class is likely to contain pupils ranging from early concrete to mature formal in Piagetian terms" (p. 468).

Piaget (1952) described two main cognitive processes of assimilation and accommodation. "Assimilation, the basic way of knowing, transforms incoming information, so that it can fit into existing forms of knowledge" (Elkind, 1974, p. 6). Accommodation occurs when the child has adapted her existing knowledge to incorporate the new information (Santrock, 1997). These two processes are thought to occur even in infancy. As children mature, their information processing capacity increases with their increasing cognitive resource, resulting from more cognitive capacity and evolving experience and knowledge (Jacobsen, 1998). Such mental growth creates new cognitive systems, which allow for increasing cognitive operations or structures "that radically alter the form of learning" (Case, 1993, p. 219) of which children may be capable.

Equilibration is the mechanism in Piaget's theory, which regulates the dynamic relationship between assimilation and accommodation, leading to "expanded forms of thought and broader

ranges of assimilation" (Eklind, 1974, p. 7). When a child experiences a disequilibrium or cognitive conflict in trying to understand the world, she tries to reach a balance or equilibrium of thought. When this conflict is resolved the child can then move on to the next stage of thought. Thus mental growth is a progressive series of attempted assimilations, necessary accommodations and new equilibrated assimilations at a higher level (Eklind, 1974). Schema and schemata are the names for the cognitive structures that result from this process. Schemata structure the perceptions and understandings of the world, and "consist of the underlying organisation of events and objects that make up a typical pattern of behaviour" (Nuthall, 2000, p. 6). Palincsar (1998) explains that schemata (and also heuristics), "are assumed to underlie such phenomena as problem solving and transfer ability" (p. 347).

Eklind (1974) explains that material consistent with one's own existing knowledge is more *easily* assimilated. Therefore people might limit the new information they are required to assimilate by only reading or listening to new information which can be easily accommodated within their existing knowledge. Such an approach to new information may reflect an unwillingness to experience disequilibrium or cognitive conflict. Anecdotally, this type of response may be observed in the classroom from time to time. For example, if task requirements appear to need specific prior knowledge which a child does not already possess, and which might be "too hard" to obtain in a short time, she might avoid it if at all possible. A different risk is that new information may be *in*correctly accommodated due to an *in*correct existing structure, resulting in mislearning of new concepts. A further aspect discussed in the previous section is that emotional states may also be included within existing schemata (Ellis, Varner & Becker, 1993) relating to either concepts or classroom processes. In the event of disequilibrium being excessively uncomfortable, this might become strongly conditioned with specific events and episodes of cognitive conflict. According to Piagetian epistemology, cognitive conflict is regarded as a vital process in children's learning, therefore any emotional impact or negative emotion association with this process will be equally important. For example, if a child learns to avoid cognitive conflict she will reduce her opportunity to develop knowledge structures, whereas if she welcomes cognitive conflict she should "radically" (Case, 1993, p. 219) increase her cognitive capacity.

Cognitive conflict may occur not only internally but also through social interaction. "Socio-cognitive conflict" (Palincsar, 1998, p. 350) is an important mechanism for explaining how social interaction leads to learning. The cognitive conflict that arises during classroom arguments or

discussions is important to intellectual development (Anderson, Nguyen-Jahiel, McNurlen, Archodidou, Kim, Reznitskaya, Tilmans & Gilbert, 2001). An important implication of this centrality is that children should be actively encouraged to debate and argue different perspectives when they are interacting. Therefore children's classroom interactions need to be designed and managed effectively. For example, Palincsar (1998) cites research that found that children working with peers on Piaget's conservation tasks demonstrated more cognitive growth than did children working alone. A significant finding was that the children who benefited most from working with peers were those who were actively engaged in the problem solving activity. Cognitive conflict may not occur without the opportunity for verbal interactions (Palincsar, 1998) or if the peer dominance or influence of a group of students impacts whose opinion is adopted (Anderson et al, 2001). Therefore the type of social interaction required in classroom activities must foster effective group dynamics, and be "fair", and as Nellie - one of the children in my research project - has recommended, "make sure everyone gets a turn".

Socio-Cultural Perspectives

Socio-cultural perspectives derive from Vygotsky and his colleagues such as Luria, Leontyev and Bahktin (Nuthall, 1997). Socio-cultural theory acknowledges that individuals develop in a social context, which comprises parents, teachers, peers, colleagues and mentors whose beliefs, goals and cultural identities are in turn shaped by their own contexts. Nuthall and Alton-Lee (1997) confirm the impact of socio-cultural theory on teaching by explaining that:

> Socio-cultural perspectives focus on the culturally-embedded nature of classroom learning processes, and the central role of cultural norms and artefacts. Learning and thinking are primarily social processes mediated through activities and contexts in which they occur (p. 10).

Mediation is the process whereby internal cognitive activity (both individual and social) is shaped by external culturally determined means or tools, such as language (Wertsch, 1991). Vygotsky (1981) regards language as "the primary cultural tool used by humans to mediate activities, (and) is instrumental in restructuring the mind and in forming higher-order, self-regulated thought processes" (Berk & Winsler, 1995, p. 5). According to socio-cultural theory, language and thought initially develop separately but eventually merge (Santrock, 1995). Based on the premise that all mental functions have external origins, children must use language and communicate externally with others before they focus on their own internal mental processes.

Language is but one of the mediational tools and signs known as "semiotics" (Palincsar, 1998, p. 353). Semiotics also includes various systems of counting, mnemonics, algebraic techniques and various conventional signs and symbols (Vygotsky, 1981). The mediational function of language is particularly relevant to my thesis, as language is the primary evidence of the children's internal cognitive activity, and the primary communication mode between the children and their teacher in the classroom. As also explained in the previous section, vocabulary is required for children to report their moods or emotions. Group activities are also generally structured around discourse. The mediational function of the other types of semiotics is also relevant when analysing children's behavioural and verbal responses to visual instructions for specific classroom tasks and activities, and their written outputs.

Socio-cultural theory argues that the internal processes of learning will only operate when the child is interacting with other people in his environment, including peers (Palincsar, 1998). These interactions take place in the zone of proximal development (ZPD), which is conceptualised as a measure of individual learning potential. The ZPD belongs to each individual child and its lower limit is the level of problem solving reached by the child working independently. Identifying the actual and potential levels of development requires an assessment of the accomplishments a child can demonstrate alone, and what she can do with assistance (Palincsar, 1998). Proceeding through the ZPD requires close collaboration with the instructor, reaching the upper limit when the child can adequately perform the task alone (Santrock, 1995).

The upper level of the ZPD is the level of the child's potential development, determined by how much the child might achieve with assistance and guidance of adults, "in co-operation with his more intelligent partners" (Vygotsky, 1935, translated in Shayer, 2003, p. 470). It is interesting that this translation uses the word intelligence, which would appear to be contradictory in the current context of believing that every child has the potential to learn in the socio-cultural context. In contrast to the cognitive perspective's centrality of conflict, the socio-cultural perspective has used the term "collaboration" in the above quote.

Shayer (2003) explains a range of shortcomings associated with the ZPD, not the least of which is that the ZPD has "been taken out of its original context of individual testing, and displaced to the context of school learning as a social process" (p. 471). Treating ZPD as a group zone undermines the purpose of identifying an individual child's ZPD, for which there would be a wide range of individual differences within a classroom. Although not as starkly obvious as

Shayer's (2003) 12-year gap, when we compare the New Zealand achievement data for the children in my inquiry in the methodology chapter (Chapter Four), a wide range of ZPD's is also implied.

Latterly the term "scaffolding" (Smith, 1998, p. 230) which was initially used to describe the caregiver's role in early parent-child interactions has been used to describe the guidance that occurs in the ZPD. Within the ZPD there must be joint attention (Smith, 1998), which creates a context for student and expert interaction. During the joint attention "encounter" (p. 232), both parties jointly attend to and act upon the topic being studied. These social interactions will in turn be structured by the ways in which language is used (Nuthall, 1996). Effective communication between teachers and students also "presumes intersubjectivity – that is, shared understanding based on a common focus of attention and some shared suppositions that form the ground for communication" (Rogoff, 1990, p. 7). Intersubjectivity is a core component in supportive and caring relationships, provides a context for joint attention, is fundamental for cognitive development and is required for effective scaffolding (Smith, 1998).

Part of the effectiveness of joint attention is the sensitivity required by the caregiver or teacher, and the development of "affective understanding" (Smith, 1998, p. 233) between the two parties. Denzin (1984) has proposed a further dimension of "emotional intersubjectivity ... [which is] an interactional appropriation of another's emotionality such that one feels one's way into the feelings and intentional feeling states of the other" (p. 130). Emotional intersubjectivity indicates that an emotional connection is an important part of the process. Emotional intersubjectivity might include a range of socially situated emotional experiences including actual shared feelings, and emotional infection (Schutz & DeCuir, 2002). This might also include emotional contagion (Jenkins & Oatley, 1998). Within the classroom, intersubjectivity may occur more easily between peers. As Nuthall (2001) has observed, in managing their classroom experience, students "get upset and anxious if they notice that the teacher is keeping more than a passing eye on them" (p9). Palincsar (1998) identifies the "intersubjective attitude about the joint construction of meaning" (p. 355), as an important challenge for postmodern constructivist teaching.

Cognitive-Constructivist Meets Socio-Cultural

Postmodern constructivism is "heterogeneous" (Lapadat, 2000, p. 2), embracing and accommodating both Piagetian and Vygotskian theory, despite their apparent contradictions

(Smith, 1998; Anderson et al, 2000; Palincsar, 1998). For example Nuthall (1999) compares the two theorists' perspectives on internalisation:

> Whereas for Piaget the mind becomes the cause of its own development as internalized mental structures become better at managing the external world, for Vygotsky the changing social world is the source of mental development (p. 176).

While there appears to be conflict as to the source of the internalisation process, each of these perspectives argues the significance of the self and context.

Shayer (2003) has conducted a thorough comparison of the two theorists, presenting some interesting snippets of background information. For example, in terms of each theorist critiquing the other's work, he explains that Vygotsky only had access to Piaget's work up to 1924, "and Piaget did not read Russian so had even less access to the bulk of Vygotsky's later thinking" (p. 473). Shayer (2003) believes that "by 1933, the two had reached an almost identical position" (p. 474), and that their theories work "in tandem" (p. 477). He raises the most interesting point that neither Piaget nor Vygotsky actually engaged in classroom research (Shayer, 2003). He compares the complementarity of their theories to similar complementarity in the physics domain on the wave and particle theories of electrons and photons. For example in physics, according to the Heisenberg Uncertainty Principle, an electron can exist as a wave or particle simultaneously, and it only becomes a particle when it is observed (Capra, 1983). This principle opposes the earlier paradigm that an electron was solely a particle. The implication is that is that all scientific theories need to be modified as more findings emerge, and that "scientists do not deal with truth: they deal with limited and approximate descriptions of reality" (Capra, 1983, p.33).

This view is consistent with the descriptions of postmodern constructivism presented above. It is also a useful example of the need for a constructivist perspective in education, as our world keeps changing and certainties become more *un*certain all the time. In using the wave-particle example, Shayer (2003) appears to be arguing that the process of internalisation only becomes apparent from the perspective we view it. While both perspectives recognise the importance of the social component, for Piaget, the mechanism is through conflict, while for Vygotsky it is through collaboration.

Shayer (2003) also suggests that Vygotsky and Piaget would each have needed the other's descriptions of development and learning, "had (they) gone on in the work of improving

schooling" (Shayer, 2003, p. 478). What is fascinating is that the educational psychology and educational research communities are now doing so.

Socio-constructivist perspectives

The blending of cognitive constructivist and socio-cultural perspectives has resulted in a blending of terminologies. Hickey (1997) explains that drawing from the work of Vygotsky and his followers (e.g. Rogoff, 1990; Wertsch, 1991), "socio-constructivism has emerged as a dominant force in efforts to understand and improve school learning" (p. 175). Palincsar (1998) acknowledges that there is a wide range of opinion within the various postmodern constructivist approaches, as to the extent and direction (waves and particles again) of the socio-cultural impact on the learner.

Palincsar (1998) confirms that the commonly held view is the interdependence of social and individual processes in the co-construction of knowledge. Postmodern constructivists regard learning and understanding as inherently social, with cultural activities and tools ranging from symbols to artefacts to language being regarded as integral to conceptual development. Palinscsar (1998) identifies a wide range of research methodologies that come under the broad category of socio-constructivist research. These include classroom research projects ranging from collaborative decision-making, situated motivation and co-regulated learning. See Palincsar (1998) for a full analysis of socio-constructivist classroom perspectives. Hickey (1997) identifies other research areas potentially relevant to and compatible with socio-constructivist research perspectives. These include "interest" research deriving from Dewey's (1913) theory initially, "flow" research using the experience sampling methodology (Csikszentmihalyi, 1975), and the role of affect in motivation. These three domains are particularly relevant to my thesis, due to its focus on the role of emotion or mood in children's task engagement and learning in the elementary school classroom.

Implications of Socio-constructivist Perspectives for Pedagogy

The traditional individualist approach to teaching in the West originally derived from behaviourism, particularly the direct instruction technique (Palincsar, 1998). Direct instruction or "transmission model of teaching" (Lapadat, 2000, p. 2) assumed that learning would occur through the "accumulation of bits and pieces of knowledge and skills" (Sergiovanni, 1994, p.

184), facilitated through guided practice and provision of the appropriate rewards. The emergence of cognitive approaches to learning increased the awareness of the need for meaning and understanding towards problem solving and knowledge transfer (Palincsar, 1998; Bereiter, 1997). Therefore, teaching strategies require the teacher to structure and manage learning activities so that students have the opportunity to question and engage in "authentic problem solving in real contexts" (Sergiovanni, 1994, p. 2). These may be set up in ways that allows the teacher more control earlier in the process and models the required problem solving skills. Eventually students develop expertise in their own questioning and problem solving skills. However, according to Lapadat (2000), these teaching and learning activities still reflect a transmission model because they imply that students have to modify their conceptions to fit the "truth" (p. 2).

Teachers' efforts to improve their own questioning skills and students' efforts to improve their own cognitive strategies in response could be argued as perpetuating the transmission model. Lapadat (2000) suggests that a socio-constructivist view of truth may be more appropriate. She describes this as a "transactional theory of truth.... [where] understandings change as the context changes" (p. 3).

The importance of authentic learning has been identified by Sergiovanni (1994), as one of the key outcomes for teaching from a cognitive constructivist perspective. A Deweyan interpretation of authentic instruction involves creating environments similar to those of practitioners (Crawford, Krajcik & Marx, 1999), and related to students' interests. For example in a science classroom, authentic instruction would engage the students in activities mirroring those of professional scientists. Crawford, Krajcik and Marx (1999) offer an example of a possible classroom-based authentic activity related to Newton's law. They suggest that the concept of gravity could be taught through exploring questions such as how you can ride on a skateboard, or what happens when you fall off a skateboard. This might enable students to "build connections between abstract science concepts and real-world applications" (p. 704). The second key outcome for teaching as proposed by Sergiovani (1994), is the need to develop "cognitive apprenticeships to promote it (authentic instruction)... Students learn best by doing and doing is best when it is lifelike" (p. 192). Rogoff (1990) has also proposed an apprenticeship metaphor to describe the practice in which those with more experience assist those with less experience or novices through guided participation.

Palincsar (1998) explains that "the influence of social constructivist perspectives has led to re-examining what it means to teach and learn across subject matters" (p. 365). It also has a major impact on assessment. The unique nature of students' learning, and the individual differences in what has been learned, will require assessment methodologies that enable students to demonstrate what they know, yet still comply with rigorous criteria of assessment (Windschitl, 1999). Rather than expect students to regurgitate knowledge or demonstrate their knowledge of imposed truths, authentic assessment from a social constructivist perspective is "dynamic" (Palincsar, 1998, p. 366), and should be designed to enable the student to demonstrate process skills if required. For example, Palincsar (1998) cites the assessment method used by Magnusson, Templin and Boyle (1997) whose fourth grade students in a science class were assessed on their predictions, their observations, and the quality of their analyses and inferences. Assessment strategies will also have an impact on students' goal orientation (Ames, 1992). Anecdotally, many students infer the main purpose of a task as primarily being its completion.

Hickey (1997) identifies the core of socio-constructivism perspectives as they impact pedagogy:

> The label socio-constructivist is applied to a bewildering array of pedagogical treatments (such as) cognitive apprenticeship (Collins Brown & Newman, 1989), communities of learners (Brown et al, 1993) .....At the core of each of these examples are tasks and activities structured so that people and objects serve to model and coach understanding and performance to scaffold learning (p. 176).

In order for a teacher to be able to scaffold each student appropriately, she will need to have an accurate knowledge of each individual student's existing lower level in the ZPD (Palincsar, 1998). Within the transmission model, to have that level of awareness across all subject domains may be too huge a task for any teacher in addition to holding all the knowledge and authority. For example, Nuthall (2001) has found that "students already know 40 – 50% of what teachers intend to teach them" (p. 9). Therefore students spend a lot of time engaged in activities relating to concepts they already know and can do. Because each child's existing knowledge is unique, and only a minimal amount is known in common, what each student eventually learns is also unique (Nuthall, 2001).

Constructivist pedagogy brings "student influence to the intellectual life of the classroom and may be the most advanced level of student ownership" (Saphier & Gower, 1997, p. 382). Therefore teaching in constructivist classrooms will require a paradigm shift on the part of teachers. Sergiovanni (1994) suggests that the teacher will occupy a range of roles when teaching

for understanding and creating learning communities. These roles include management, executive, mediating and leading (Segiovanni, 1994).

As noted earlier, Windschitl (1999) argues that a constructivist approach cannot be an isolated event or token gesture. For example a teacher may espouse a socio-constructivist approach, yet have the desks arranged in a classroom layout more suitable to the transmission model. Unless the ethos of the school itself also espouses socio-constructivism, it may be difficult for a teacher to relinquish the apparent control of a traditional classroom, as well as defend her methods. An important factor also relates to class size, which will impact how the desks are arranged, even to just fit everyone in. As will be discussed in my thesis, room layout provides a range of social and physical affordances, which in turn have an influence on individual learning experiences and emotional responses. Due to class size, collaborative group work is an attractive option, which provides peer scaffolding in the *best* scenario, but peer conflict in the *worst*. However, during the many hours of classroom observation for my thesis, there was no evidence of students having been trained for working within groups, in which discrimination based on gender and perceived ability, was demonstrated on many occasions.

A socio-constructivist approach will require that students have enough time to engage in authentic activities. However, according to a quote from Howard Gardner's interview with Brandt (1993), in most classrooms "coverage is the enemy" (p. 7). Curriculum demands tend to require teachers to cover increasing quantities of information, which will "actually ensure that most kids are not going to understand. You've got to take enough time to get kids deeply involved in something so they can think about it in lots of different ways and apply it" (Gardner interview, 1993, in Brandt, 1993, p. 7). Piaget has also been quoted in a similar vein by one of his former students at the 1963 Conference of Cognitive studies and Curriculum Development:

> The goal in education is not to increase the amount of knowledge, but to create the possibilities for a child to invent and discover. When we teach too fast, we keep the child from inventing and discovering himself (Duckworth, 1964, p. 3).

Anecdotally, children frequently have trouble keeping up with the teacher, especially when a series of instructions is being "rattled out" verbally. Students themselves also play an important role for others in the class. Nuthall and Alton-Lee (1997) have identified that "interaction with the knowledge and beliefs of peers within significant social groups appears to play a privileged role in (students') generating new beliefs and knowledge structures" (p. 10). Student discourse is an

important component of the learning process and the culture of the classroom (Nuthall & Alton-Lee, 1992). However, students require scaffolding in appropriate ways of discourse.

This issue is relevant to my thesis. Much of the student discourse observed was on non-content related events such as issues of social importance and procedural aspects of tasks. The classroom discourse also included evidence of gender bias, such as Jack (a subject in one of the earlier classroom studies) referring to one of the girls as a "witch". As recommended by Herrenkohl, Palincsar, DeWater & Kawasaki (1999), "if we want students to be supporting each other's thinking then we need to help them find the voices to do so" (p. 454). They describe two sets of student roles namely a procedural set to use when working in small groups to complete their tasks, and a second socio-cognitive set which they adopt when questioning and commenting on each other's thinking in science. This resulted in more elaborative and productive discussion, with evidence of deeper understanding of the concepts under study. Resulting from her own study of two elementary school students, Lapadat (2000) also recommends that "teachers would do well to attend to the discourse in their classrooms, as it is in discourse that scientific knowledge is constructed and validated" (p. 12).

However, even with training in appropriate discourse and collaborative processes, many capable students may not be interested in helping their peers, "and the negative consequences of group work – such as bickering, exclusion, and academic freeloading – are common" (Windschitl, 1999, p4). Palincsar (1998) notes that "it is hard to imagine a more significant challenge to social constructivism than promoting meaningful learning for all children" (p. 368).

Having undertaken a major review of the research on classroom learning in 1995, Nuthall and Alton-Lee (1997) confirmed three broad and different perspectives on the way that students learn. These were the cognitive constructivist, the socio-cultural and the linguistic perspectives. Nuthall and Alton-Lee (1997) argue that distinctions between these three perspectives "can no longer be sustained", and that "learning and thinking are essentially the same and they are as much matters of social interaction and of language use as they are of the mind" (p. 11).

Later Nuthall (1999) proposed that the classroom actually shapes students' minds, emphasising that "education is about the transactional relationship between the individual cognitive and the socio-cultural interactive dimensions of human experience" (p. 143). While not labelling this perspective as such, Nuthall's (1999) notion of a transactional relationship is consistent with the

socio-constructivist perspective. Nuthall's (1999) individual cognitive functions refer to individual learning and memory processes. Nuthall's (1999) interactive dimension refers to the socio-cultural aspects of the classroom context.

Individual Cognitive Dimension

As a result of their findings from the Understanding Learning and Teaching Project (1997), Nuthall and Alton-Lee (1997) proposed a model of student learning. Their model was developed through parallel studies of contributing cognitive and social processes and incorporating findings from such research as sociolinguistics, small group psychology, socio-cultural theory, and cognitive science, including schema theory and autobiographical memory.

This model draws attention to two main components of the student's mind, the short-term store - or working memory, and the long-term memory (Nuthall & Alton-Lee, 1994). Long term memory contains ideas, concepts, and other types of knowledge and skills "more or less permanently" (p. 5). The short term or working memory stores individual experiences temporarily, while the mind attempts to interpret and make sense of them. Making sense of them starts with making connections to what is already known (from long-term memory), elaborating the content, evaluating the truth and consistency of the information, and developing metacognitive awareness. "It is in this working area that ideas and concepts are born" (p. 5).

The process of creating new concepts requires repeated experiences. Nuthall and Alton-Lee (1997) have demonstrated that in order to create new concepts (or learn new information) students need to interact with the new material on three to four occasions with no more than two days between each interaction. During each interaction new information is sorted, elaborated on and integrated, in relation to existing knowledge. The knowledge structures or schemata in long term memory actually "determine how a pupil expects experiences or ideas to connect or fit together" (Nuthall, 2000, p15). For example, where there are significant misconceptions in long term memory, "the learning which would normally take place from classroom experience is subverted" (Nuthall & Alton-Lee, 1994, p. 5). This conclusion implies a prime role for prior knowledge and experience in the creation of new concepts, which prompts Nuthall and Alton-Lee's (1997) question:

> Because new experience is filtered through existing knowledge and beliefs, creating significant cognitive change appears to present a 'paradox'. How can new knowledge and understanding be created when existing knowledge determines how experience is perceived and understood? (p. 10)

Perceiving the role of existing knowledge as the determinant of new learning is relevant to my thesis in two ways, as has been noted earlier. Firstly, existing schemata may include emotional components (Ellis, Varner & Becker, 1993). Secondly, negative emotions may be associated with avoiding cognitive conflict or disequilibrium. Another important finding from the Understanding Learning and Teaching Project, was that the same model of learning occurred for all the students sampled, irrespective of their achievement (or ability) measures (Nuthall & Alton-Lee, 1997).

However there were differences in the extent to which students created learning opportunities, or made use of the opportunities and resources available in the classroom. Students with higher achievement seemed to understand the purposes of the activities. Because they shared the same culture and unspoken assumptions as the teacher, they were better able to participate. As Nuthall and Alton-Lee (1997) argue, some students have to cope with and learn to live in two different cultures - the culture of their home and friends, and the different culture of their teacher. Other students need only live in one culture. Students who live in two cultures have to make more effort in order to understand the assumptions and implications of the classroom. Nuthall and Alton-Lee (1997) conclude that these cultural differences produce cumulative effects. These cultural differences are not confined to ethnicity, but will also include philosophical differences within the same ethnic groups, such as religious beliefs or humanist versus behavioural approaches to parenting, or left wing versus right wing politics as just a few examples.

From their extensive data analyses of students' concept learning which has been tracked through specific coding and collation into concept or item files created during the Understanding Learning and Teaching Project, Nuthall and Alton-Lee (1994) have also demonstrated that students' thinking processes reflect their social interactions in the classroom. "Thinking processes do not arise, as it were, from within the mind, but as the imitation within the mind of processes that are learned in interaction with other people" (Nuthall & Alton-Lee, 1994, p. 7). This has important implications for the classroom, in that social organisation becomes as much a curriculum issue as the content. Because students' thinking skills are as dependent on social interactions as they are on the academic tasks, "the nature of learning and memory, and of academic ability, are as much

a product of classroom experiences as they are a cause of them" (Nuthall & Alton-Lee, 1997, p. 11).

As a consequence, Nuthall (1999) has latterly included social interactions within his model of student learning. Social interactions "permeate" the process of working memory, which is "distributed across the boundary between the private and social worlds of the classroom" (Nuthall, 1999, p181). Nuthall (1999) argues that if the processes of individual knowledge acquisition are the products of student participation in the learning activities of the classroom, there must be a transactional relationship between participation in classroom activities and working memory. "Working memory can now be redefined as the parallel and interactive mental re-enactment of the processes and structures of classroom learning activities" (p. 180).

Internalisation for Nuthall (1999) therefore involves both structures and processes of the classroom activities and the knowledge structures or concepts.

> During this internalisation process, not only are knowledge acquisition activities/processes incorporated into working memory, but so is the social and cultural context in which they take place (Nuthall, 1999, p. 189).

Summing up the Theoretical Perspectives of the Constructivist Classroom

This section has briefly outlined the aspects of the constructivist classroom relevant to my research. From the general overview perspective of constructivism as a worldview and its implications as to what constitutes knowledge, this section has included a brief summary of socio-constructivist perspectives on the classroom. The theories of Vygotsky and Piaget have been compared and contrasted, with the outcome that they are both extremely relevant to understanding children's learning in the postmodern constructivist classroom. This section has concluded with a brief summary of the findings of Nuthall and Alton-Lee across a series of publications. The findings of Nuthall and Alton-Lee are relevant to this discussion in at least three ways. First, these findings provided the research base and theoretical context for the Project on Learning, in which context this PhD research was conducted. Second, these findings are relevant to the New Zealand classroom context, and third, their findings reflect the types of intentions and research methodologies of the socio-constructivist perspective.

My inquiry is investigating the role of emotion or mood in children's learning task engagement in the elementary school classroom. The classroom contexts for my research were under the direction of teachers who generally espoused constructivist perspectives. Therefore it has been necessary to see how this perspective might impact learning tasks, children's engagement in them, and how or what they might learn from them. The following three major themes arise from this theoretical perspective discussion, in respect of being interested in emotion. These are as follows:

Internalisation

Internalisation will include emotional conditioning, learning history and prior knowledge. These are all important for new knowledge to be built on old knowledge correctly. Nuthall's (1999) working memory model includes social interaction as well. My inquiry will investigate whether there is a role for mood or emotion in this model of learning. If learning is internalisation based on the theoretical perspectives discussed so far, then emotions will be "right in there" entwined with the concepts, and taking a major role in how they are stored and retrieved.

Social Interactions

Socio-cognitive conflict is significant and necessary for learning, within the cognitivist Piagetian tradition. Therefore, emotional conditioning will be relevant. For example, if a classroom and broader education culture relies on getting right answers, then there will be discomfort in disequilibrium. This is likely to induce negative emotions. Getting the answers right requires access to the "right" knowledge, so that there has to be equity of access to all resources required. Since last year under new education initiatives, New Zealand is now providing scholarships over the value of $15,000 to the top achievers when they leave school for university. This is a huge jump compared to previous years, adding a further "carrot" for achievement - yet already equity of access is being hugely debated, accompanied by equally huge stress and negative emotions. This raises the stakes overall and may well filter through to the elementary school classroom, where anecdotally some children already say that they come to school to get an education and a good job.

Negative emotions are also likely to be elicited during group activities when children are arguing, unless they know how to do so without creating conflict and its associated emotions. The socio-

cultural tradition tells us how important it is for social interactions to provide the optimum opportunity for learning. In terms of Lazarus's (1991) theory, social interactions in these group activities will be adaptational encounters for the individual children. There will be individual differences in the cognitive skills of the children within the classroom, likely in turn to elicit a range of emotions if children are trying to understand different points of view. ZPD will be impacted by emotional intersubjectivity either between teacher and child or between the children themselves. Emotional connection or intersubjectivity will be much less likely if children need to compete with each other in the end at assessment time for top place.

Tasks

Tasks are important, as these are the structures that help internalisation through creating schemata. In order to complete tasks children need to be able to follow the instructions, access resources and so on.

Implications for Research

As with Lazarus's (1991) view that emotion should be researched in the field, so too should children's classroom experience be researched in the classroom. "A principled pragmatic approach" (Hickey, 1997, p. 184) should be the order of the day, depending on the issues under study. The next chapter presents the empirical foundations and findings, relevant to my research question as to the role of emotion in Children's learning task engagement in the elementary school classroom.

CHAPTER THREE: EMPIRICAL FOUNDATIONS AND FINDINGS

We have seen the diversity and extensiveness of the two main theoretical domains, from which my research question as to the role of emotion in children's learning task engagement in the elementary school classroom, was both derived and situated. In order to source the most salient findings to inform and support my inquiry from the breadth of literature available within these two domains, this literature review will be reported under several main categories. The review begins with my reporting relevant developmental findings including young children's vocabulary and ambivalence. More recent findings on learning task engagement through the perspective of the three functions of the mind of emotion, motivation and cognition (Snow, Corno & Jackson, 1996) are then summarised. The classroom context and children's emotions are then brought together in a section reporting the classroom-based research findings on children's emotions across the age span. From the classroom context literature, I then report research findings on emotion in relation to antecedents, learning, achievement, and gender differences, across the age span. In addition to the research findings, research methodologies are also addressed. I then examine the most recent research using the experience sampling methodology (ESM) (Csikszentmihalyi, 1975) with university student samples. For example, the specific emotions sampled in Zelenski and Larsen's (2000) ESM study were similar to those in the present inquiry. These latter empirical methods and findings indicated the continuing possibilities that exist in the combined domains of children's emotions and their learning within the school classroom context. The literature review concludes with arguments for the multi-method approach as the most viable and reliable methodology for exploring emotion in the classroom context.

Given the previous discussion on the diversity of emotion categories and vocabularies, this literature review will use the terminology as presented in the specific articles being discussed. For example if the authors describe "affect", I shall also use this term to accurately reflect their perspective. As has already been established, irrespective of the differences in the use of terms such as "mood" or "emotion" or "feelings" and so on, it is the emotion system that is being referred to. Due to the complexities of both emotion and the constructivist classroom context, specific details of the diverse methodologies in this literature sample are also included in conjunction with their relevant findings. Determining appropriate research methodologies is an important aspect of any inquiry on emotions. As noted by Shutz and DeCuir (2002): "Currently in the area of emotions, there are calls for a paradigm shift in how we approach inquiry" (p. 131). Lazarus (1991) identifies a range of research implications. For example, he states that "after forty

years of research experience I doubt that any study can "prove" hypotheses or hunches about appraisal and emotion" (p. 435). Despite the inherent difficulties however, Lazarus (1991) also states:

> I favour an in-depth measurement rather than psychometric surveylike approaches. We should make careful naturalistic observations, which would allow us to address the complex meanings of an event for each individual. We should try to get below the surface level wherever possible (p. 428).

Developmental Research on Emotion

Developmental research over the late 1980's and early 1990's has yielded a range of findings relevant and useful to my inquiry. The emotional developmental findings presented in the previous chapter are already based on extensive research in the developmental domain. For the purposes of my research question, it would be also helpful to know how other researchers of children's emotions had fared. For example, was there any field research demonstrating similar findings to the laboratory findings? What were some of the logistical difficulties in researching children's emotions in naturalistic settings? In this section, I report a series of findings from young children confirming that by the time they are nine years of age, children should generally be able to engage in conversation about their feelings.

Children as young as eighteen months have been shown to display emotions and use emotional cues from other people. By four to five years of age, children demonstrate improving ability to reflect on their emotions and understand how these differ in relation to events (Smith, 1998). Based on a series of studies on parent-child relationships, Dunn (1996) found that children's emotional understandings from three years of age and beyond were reasonably consistent, irrespective of between-family differences in emotion communication and warmth. This is consistent with Ackerman and Izard's (2004) finding that children's knowledge of basic emotions such as happy and mad – along with their typical labels – is "fairly complete by roughly three years of age" (p. 272).

Wellman (1995) found similar levels of emotion understanding and vocabulary in younger children. Using the longitudinal records of the CHILDES Database, Wellman (1995) conducted two in-depth analyses of the everyday language from two-year-old children's conversations. He searched the extensive longitudinal records (over 120,000 utterances), of five selected English-

speaking children, whose individual utterances ranged from 8, 000 to 40, 000 per child. (Wellman, 1995). From the total utterances, 28 everyday emotion words including the usual emotions such as curious, excited, happy pleased, smiling through to angry, bored, upset and yuk, were selected. The analysis distinguished between simple versus complex utterances and also pain words such as "ouch" (p. 5). Wellman (1995) analysed causes for and objects of these emotions as well as categories of "contrastives" (p. 295). He concluded that when children used their emotion vocabulary they were not just referring to typical behavioural scripts, but they were indeed referring to their own and others' subjective feelings. With Bartsch, Wellman (1995) then conducted a parallel analysis of these same five children plus another five children. They found approximately 12, 000 goal-related and/or belief-related utterances, which they subjected to detailed analysis in conjunction with the emotion words. From their results, Wellman concludes that two-year old children are capable of making the correct attributions about subjective experience, also referring to these subjective experiences using the correct emotion vocabulary. Wellman (1995) argues that this confirms children's readiness to "construe emotions mentalistically" (p. 20).

Harter and Buddin (1987) conducted an in-depth study on children's understanding of the simultaneity of two emotions. The 126 children in their study ranged in age from 4 – 12 years. First, the children' understanding of positive and negative emotions were tested using seven "pictorial stimuli" (photographs of a same-gender child), three depicting a range of positive emotions and four depicting a range of negative emotions. The children were asked to sort these photographs into two groups of either "good feelings" (p. 391) or "bad feelings" (p. 391). The emotions portrayed were not labelled so that the children were free to use their own labels. All the subjects including the 4-year-olds were in 99.4% agreement for the positive emotions and 81.8% agreement for the negative. The next stage of the research was to find out whether children could identify multiple emotions of either the same or mixed valence. The photographs were set out on a large board, with various same-valence and mixed-valence emotion combinations indicated. Each child was presented with the board and asked to name the various combinations. The children's responses "revealed a very definite pattern ...[of] developmental differences in children's ability to differentiate and integrate emotion concepts" (p. 395). At the lowest level, children between 4 and 5.79 years could not co-ordinate two emotions. From 5.8 to 7.59 years, the children could identify both positively and negatively valenced emotions to different aspects of a situation. From 7.6 to 9 years children could identify two emotions of opposite valence at once - but about different objects. By 9 to 11.18 years (the same age as the children in my

inquiry) children could acknowledge that an object might elicit both positive and negative emotions. For example, the same present might cause happiness and disappointment.

Harter and Buddin (1987) do not see this as ambivalence as it does not necessarily indicate conflict. They found that in approximately only 50% of the situations did the older children report an experience of conflict. Harter and Buddin (1987) acknowledge that their categories are reflective and represent "cognitive reconstruction" (p. 398) of the events, and may not be true of actual emotional experience at the time. For example, they suggest that a child in retrospect might say "at the dentist I was scared about the needle but happy I was getting my teeth fixed", while at the time, being scared was the main feeling (p. 398).

Harter and Whitesell (1989) then used Harter and Buddin's (1987) data (above) to further analyse the underlying cognitive-structural changes that may be related to developmental differences in children's understandings of simultaneous emotions. Using a content analysis of the children's responses to their open-ended questions, they compared the children's prototypes of happy, mad, sad and scared to the similar adult prototypes (Shaver, Schwartz, Kirson, & O'Connor, 1987). For "happiness or joy" children's causal categories of "getting something (they) wanted" (Harter & Whitesell, 1989, p. 107) was the most frequent cause - as it was for adults. Specific content might differ of course based on the age differences. Reasons relating to task completion or success were also similar. For anger, children's main responses of physical or emotional pain (such as being hit or yelled at) and things not working out, showed no developmental differences across the children and some differences in content from the adults. Similar trends were found for the other two emotions of sad and scared. The authors conclude that the prototype model is relevant for children as it is for adults, allowing of course for specific content to differ. These findings would be consistent with Lazarus's relational themes for these emotions. For example as noted earlier, the core relational theme for happiness is "reasonable progress towards the realisation of our goals" (Lazarus, 1991, p. 267), and for anger "a demeaning offence against me or mine" (p. 222).

Stein and Trabasso (1989) also found that children could report mixed feelings, but they disagree with Harter and Buddin's (1987) time frames. They found that at least half of the 36 six-year-olds in their study "understood [and could] spontaneously talk about situations that elicit both good and bad feelings" (Stein & Trabasso, 1989, p. 65). These discussions focused on goals and outcomes. Their conclusion is not necessarily whether a single event can elicit (for example) three different emotions, but that the underlying structures or dimensions of an event such as goal

attainment or failure and the conditions leading to the event explain the different emotions. Note that Stein and Trabasso's (1989) use of the term "dimensions" (p. 72) refers to goal attainment or failure and the conditions leading to attainment or failure as opposed to Lazaraus's (1991) description of dimensions. Stein and Trabasso (1989) do not concur with "prototype" (p. 71) descriptions although their description of interpreting the underlying concept is consistent with Lazarus's (1991) "ambivalent states of mind" (p. 267). In addition, Oatley and Johnson-Laird's (1998) explanations of the cognitive processing required for secondary evaluations cited earlier indicate a reasonable consensus that young children might notice and experience ambivalence.

Denham, Mason & Couchoud (1995) conducted two studies of pre-school children's responsiveness to a female adult's negative emotions. The 55 pre-schoolers ages ranged between 44 and 50 months in each study, comprised 30 boys and 25 girls, who were attending a university affiliated pre-school programme. During individual play sessions, experimenters enacted two vignettes involving each of three emotions – anger, sadness and pain. The children's reactions to negative emotions as well as their reactions after the negative emotions were explained were rated for level of prosocial response. When an adult demonstrated sadness for example, and the child behaved positively to stop the apparent sadness, this was categorised as prosocial. Overall, the pre-schoolers demonstrated moderate levels of spontaneous prosocial responses to the negative emotions of others (namely sadness, anger and pain). Across the studies, the children responded most prosocially to anger, described as a highly interpersonal emotion which often occurs with aggression (Denham, Mason, & Couchard, 1995). Denham et al (1995) believe that anger is highly salient and distressing in children's family lives. Therefore, children pay close attention to the anger of adults in their environment, and may be more familiar with adult anger than with adult sadness or pain. They also note that parents and teachers feel free to express anger in the presence of children, but may mask sadness or pain. The requesting of help by the adult may have the effect of quickly reducing children's arousal in response to the anger display by compliance. Reasons for children's compliance to adults' requests for help in these situations may be due to the adult's authority and the possibility of punishment. An alternative explanation was that perhaps children's prosocial response to adult anger is motivated by a need to reduce their own uncomfortable arousal in the presence of adult anger (Denham et al., 1995).

For the purposes of my inquiry, Denham et al's (1995) findings highlight the salience of anger as an emotion in children's relating to others. It also indicates the emotional role of the adult or

perhaps the teacher in emotional intersubjectivity (Denzin, 1984). For example, Sutton and Conway (2001) has found that the main the sources of teachers' anger and frustration are the students. There has been very little research on teachers' emotions, but what research there has been, indicates that their emotions are also significant. According to Hargreaves (1998), emotions are at the heart of teaching, and teachers' inferences about their students' emotions may actually be incorrect. "Teachers frequently misconstrue their students' exuberance for hostility, bored compliance for studious commitment, embarrassment for stubbornness, and silent respect for sullen resistance. These misunderstandings seriously interfere with teachers' ability to help their students learn" (p. 850). Teacher-related affect is also an identified variable of task engagement (Ellis, Varner & Becker, 1993).

Ackerman and Izard (2004) have introduced the Special Edition of the Journal of Experimental Child Psychology with a summary of the more recent developmental research on emotion. They confirm the developmental role of cognition, in stating:

> One salient theme is that much emotion behaviour during infancy reflects prepared aspects of a hard-wired emotions system that operates relatively independently of higher order cognitive processes. Normative development consists of increasing interconnections and interdependence of emotions and cognitive systems and acquisition of cognitive-dependent emotion knowledge (Ackerman & Izard, 2004, p. 271).

This is consistent with the evidence of entwined cognition and emotion in the developmental literature cited above, and suggests that taking the cognitive-motivational-relational approach to understanding the emotions of 9 to 11 year old children is feasible and appropriate.

In summary, the findings from the developmental literature confirm the emotional awareness and emotion vocabulary skills of children younger than the present sample. These findings have also confirmed a developmental process for understanding and explaining emotional ambivalence. This means that by 9 to 11 years 6 months of age, the children in the present sample may certainly be able to respond to questions about how they are feeling. The findings on the salience of children's responses to adult anger and the frequency of teachers' anger in response to students also indicate that the most significant relationship for effective socio-constructivist pedagogy – between teacher and child (student) – is worth exploring further.

From the children's emotional developmental perspective, it seems that they may certainly be able to contribute to any conversation about this important relationship. My inquiry approaches this relationship through its focus on the children's task engagement. Because tasks are central to constructivist pedagogy, these are the main sources and topics of communication and discussion between the teacher and the child, and the main source of frustration for the teacher when they are not completed. Therefore, through identifying and understanding the role of children's emotions during task engagement, this should also facilitate our understandings of the issues impacting emotional intersubjectivity (Denzin, 1984).

In the next section I shall update the literature review on children's learning task engagement and the implied role of emotion.

Classroom Task-Related Emotions: Entwined with Motivation and Cognition

In reviewing their own series of studies on student motivation in the classroom, Meyer and Turner (2002) explain their "serendipitous" (p. 107) finding that emotion was always present yet obscured and not articulated as it deserved to be. Classroom studies of their own that they reviewed range from those on goals and self-efficacy beliefs (1997), the influence of classroom contexts based on experience sampling (1995) to teacher scaffolding student involvement (1998). Their review showed that their multi-method approach had also yielded the incidental finding that emotion was an integral component in students' engagement in activities and learning, yet not highlighted due their attention being drawn to the original variables under study. They state:

> For example, we assumed that if an activity were optimally challenging, students would engage and pursue learning goals. We acknowledged the roles of emotion, volition and social relationships, but placed them in the background, as if not immediately relevant to our research. In retrospect, this approach seems naive.....we also failed to consider the affective process during instructional interactions, and how these experiences contributed to motivation to learn in a classroom (Meyer & Turner, 2002, p. 108).

Despite not specifically seeking emotion, Meyer and Turner (2002) found it because their research questions were conducted in real classrooms, where more information was gleaned than originally probed, and these answers "always involved emotions" (p. 108). They also cite Snow Corno and Jackson's (1996) application of Hilgard's (1980) three functions of the mind, as a useful model in understanding the entwined nature of cognition, emotion and motivation. This

finding of Meyer and Turner (2002) is also "serendipitous" (p. 107) for my thesis. At the time of my research proposal, my literature review was structured around the three functions of the mind (Snow, Corno, & Jackson, 1996), as part of my argument for the need to research emotion in its own right. Meyer and Turner (2002) conclude "we find emotion, motivation and cognition inseparable in classroom contexts" (p. 112).

In the constructivist classroom, tasks have been identified as mini-contexts for learning or internalisation processing. Task engagement was specifically included in my research question. During the years referred to by Meyer and Turner (2002) above, other classroom researchers were also investigating students' engagement in tasks, with many findings also confirming the entwined nature of the three functions of the mind (Snow et al., 1996). For example, Skinner, Wellborn & Connell (1990) agree that "one central goal of educators is to optimise children's engagement in learning activities" (p. 31). However, task engagement does not occur in isolation. Other variables such as student perceived control, student perceived autonomy and feelings of relatedness are related to task engagement. Learning activities also compete with a number of other concurrent classroom variables, including social activity, other more interesting curriculum tasks, and pre-existing interests and attitudes (Nuthall, 1999).

Other research identifies the impact of students' classroom goal perception (Hicks Anderman, 1999; Young, 1997; Ames, 1992), social goals (Wentzel, 1999), social satisfaction (Townsend & Hicks, 1997), and students' use of successful learning strategies (Paris & Turner, 1994) on classroom task engagement. Hicks-Anderman (1999) also found that affective experience in school is influenced by students' sense of school belonging. Goal formation is influenced by environmental effects, which - in turn - are mediated by emotion (Boekaerts, 1993;, 1997). Siefert (1997) explains that "environmental factors evoke emotional reactions (and) goals are defensive mechanisms in response to the emotional reactions" (p. 324), a view consistent with Lazarus's (1991) adaptational encounter.

Student understanding of the task, background knowledge and beliefs, and their involvement in their group activities is also relevant (Nuthall, 1999). However from the socio-constructivist perspective, being involved in a group activity is not only an academic task, but is also a function of social variables. Students' interactions with each other and with the teacher, reflect the culture of the wider community (Nuthall, 1999). "Classrooms are embedded in the culture of their surrounding communities" (p. 249). The classroom is "a powerful social context, in which the

psychological adjustment of children and adolescents can be affected" (Wentzel, 1999, p. 11). The social organisation of learning tasks can impact attention and on-task behaviour (Blumenfield, Mergendoller & Swarthout, 1987). For example, when interdependent tasks are complex more time will be spent dividing up the tasks. Hogan, Natasi and Pressley (2000) summarise their findings on task engagement, "Fine-grained analyses have shown that students can spend much of their time figuring out *how* to complete a science task rather than gaining higher order understanding" (p. 382). Hogan et al (2000) also found that not all children are equally engaged in their group tasks in part because their level of motivation, engagement and understanding is linked to the behaviours of the group leader. In these groups children's talk about abstract ideas is less frequent and certain than their extensive and fluent talk associated with action and design, often talking at cross-purposes.

The degree to which students engage in learning tasks, as well as the degree to which they self-initiate learning activities, is also a function of student interest and motivation (Nuthall, 1999). Novel tasks may heighten interest (Blumenfield et al, 1987). Positive feelings are correlates of individual interest (Hidi & Anderson, 1992). "Situational interest" (Hidi, 1990, p. 551) perhaps evoked at the commencement of a task, might influence the motivationally dependent aspects of task performance. However, initial interest is less likely to influence the ongoing qualitative aspects (Hirt, McDonald, Melton, & Harackiewicz, 1996). Hirt et al (1996) found that mood might contribute to initial task interest, but did not necessarily lead to enhanced motivation. Students' ongoing moods and goals were also factors.

Later findings of Ainley, Hilman and Hidi (2002) were similar, in that the immediate interest of 10th grade students in their "triggered" or immediate reactions to reading material (situational interest) was less predictive of continued reading than topic (intrinsic) interest. Topic interest was also "significantly related to the affective responses for the two texts with higher topic scores" (p. 425). Higher topic interest was more likely to be followed by a report of feeling interested, while lower topic interest was more likely associated with feeling bored. Relevant methodological aspects from this study will be discussed shortly.

Task interest is both a cause and consequence of task performance (Hirt et al, 1996). Pintrich, Marx and Boyle (1993) suggest that the impact of interest and values beliefs may be "more *affective* or attitudinal in nature" (p. 182). Blumenfield et al (1987) found that when the task is too simple or of a repetitively familiar methodology, despite its cognitive content, the task will

be seen as boring. Blumenfield et al (1987) argue that the cumulative effect of unvaried simple task content and form, produces students who are limited thinkers and alienated workers. Even creative students can have their cognitive skills impaired by boring tasks and simplistic content. Alternatively, students might opt out and choose a safe option if they want to protect themselves emotionally (Hogan, Natasi, & Pressley, 2000). Ellis et al (1993) argue that research concentrating solely on the cognitive or emotionality components of emotion (in relation to learning) may be overlooking part of the phenomenon which influences performance. Pintrich et al (1993) make a similar point: "cognition-only models of student learning do not adequately describe learning in the classroom context...[and they]...do not explain why students who seem to have the requisite prior conceptual knowledge do not activate this knowledge for many school tasks" (p. 167).

More recently Linnenbrink and Pintrich (2002) have proposed a conceptual model linking achievement goals and affect. Like Meyer and Turner (2002), they have also reviewed the diverse literature in their own research domain of goals, and also find that emotion needs addressing. They too have separated out the constructs of affect, mood, and emotion. They view moods and emotions as differing in terms of intensity and duration, suggesting that as emotions fade over time they become moods. They use the term "affect" to encompass both moods and emotions, referring to states rather than traits (Linnenbrink & Pintrich, 2002).

Motivation was also found to correlate with positive affect amongst other task-related variables, including goals and academic achievement. Motivation fluctuates with the situation, being regarded as situational (Paris & Turner, 1994) similar to interest. Motivation may be domain specific (Skinner, Wellborn & Connell, 1990) in school situations, with differences in student affect noted between English and Maths (Young, 1997). This implies that classroom emotions may be also domain specific, a further classroom contextual variable. Different domains in turn have different instruction methods (Scollon, Diener, Oishi & Biswas-Diener, 2005; Turner & Meyer, 2000) and different epistemologies (McPhail, Pierson, Freeman, Goodman, & Ayappa, 2000). Intrinsic positive motivation might be assumed to induce positive affect (Pekrun, 1992). In contrast, intrinsic negative motivation might lead to avoidance behaviours, in order to avoid negative affect (Linnenbrink & Pintrich, 2002; Hogan et al, 2000; Pekrun, 1992). This implies that negative emotions have a double impact on motivation. Besides impeding positive intrinsic motivation, negative emotions might also produce negative intrinsic motivation. An example cited by Pekrun (1992), "The primary emotion of this type is boredom, which can therefore be

assumed to produce motivation to avoid task performance and to engage in other activities instead" (p. 367). Other negative emotions such as anxiety or anger may also become linked to this (Boekaerts, 1993), increasing the strength of this negative intrinsic motivation to avoid, as well as generalising to other similar tasks. Intrinsic motivation is "intimately linked" (Pekrun, 1992, p. 366) to the experienced cognitive and emotional properties of the task. Cognitive effects of emotion include mood dependent learning, mood congruent encoding, storage and retrieval.

As acknowledged by Meyer and Turner (2002), the salience of emotion as an important variable of task engagement was there in front of us all the time. Due to the frequency with which emotion and affect terms have appeared as correlates in research of cognition and motivation in school settings, in conjunction with previous researchers' suggestions, it would seem timely to develop a research focus on emotion. As stated by Nuthall (1999), "The classroom is the place where they [elementary school students] obtain a substantial component of their minds". According to Hilgard (1980), there are three functions of the mind. These are usually distinguished as "cognition, conation (or volition) and affect (or affection)" (Snow, Corno & Jackson, 1996, p. 243). Motivation and volition are historically intertwined and might be seen to form a continuum.

> Motivation, emotion and cognition have all been superordinate ideas in psychology. Motivation refers to the meaning and purpose of behaviour. Emotion refers to experiential and psychophysiological phenomena that accompany motivational processes. Cognition refers to organismic activity not directly observable, which translates motivation and emotion into observable behaviour. Psychological theory has traditionally attempted to explain events in one of these domains in terms of events in the other ones (Spaulding, 1994, p. x).

The close inter-relationship between these three is evident in the classroom task engagement literature presented above. Nuthall (1999) indicates that children do not distinguish between different aspects of their experience. From the discussion thus far this seems feasible. It seems that there is extensive overlapping of the full range of factors consistent with the evidence of the inter-relationship between the three functions of the mind. Another relevant repeated finding across the classroom literature above is the importance of context. The notions of *situated* interest, *situated* motivation and their concurrent (and therefore situated) emotions reflect the role of context.

What is affirming and relevant for my thesis, is that my original research proposal (1999) to investigate the role of mood or emotion in children's learning task engagement was timely, and continues to be justified, when the relevant literature from the intervening years has been examined. It is also noteworthy that the detailed classroom-based research required to investigate the complexities of emotion - due to its entwined relationship with cognition and motivation, is very time consuming. Of relevance to the reader, many of the journal articles reporting this research take up more than a few pages, especially those reporting multiple methodologies with detailed quantitative and qualitative findings.

In the next section, I shall present the literature findings specifically focused on children's emotions in the classroom context.

Classroom Emotions: Across the Age Span

Children develop their own theories of curriculum and school at an early age (Bereiter, 1990). The intrinsic role of emotion in their theories was vividly demonstrated in Perreault's (1995) study, in which small groups of students were videotaped during role-plays of typical teaching situations in 2nd, 5th & 8th grade classrooms. Students were from 39 elementary and middle school cohort groups in three public school districts. Each student group made up their own role-play about school and classroom life, which was video-taped, following which video-cued interviews were also conducted. Findings included students taking the role of "teacher" behaving in a didactic way rather than giving students choices. "Delight was not an emotion students seemed to commonly associate with schools" (Perreault, 1995, p. 625). Students portrayed teaching as "a hard and frustrating job" (p. 626), and one fifth grade girl acting the part of the teacher actually turned her back to her "class" (p. 626) rather than let them see her smile. Another relevant finding was the children's "sense of the classroom as a highly contested space ...[with an] obvious struggle between teachers and students for control of the room" (p. 626). This was shown by students testing the boundaries of acceptable behaviours, with some children acting up to gain attention. There seemed to be consensus that boys act out more, and therefore get more attention. One boy explained that school is difficult for boys, and that even though it made it harder to get work done, acting out and acting cool were social requirements for boys.

A number of researchers have found that if given the opportunity, "elementary school pupils are very well able to disclose their beliefs about learning if they are adequately approached" (Klatter,

Lodewijks, Aarnoutse, 2001, p. 502). For example, children have articulated various purposes of schooling such as: to gain knowledge, for their personal future such as a job, for social aspects, or because they have to go (Klatter, Lodewijks, & Aarnoutse, 2001). In addition, "strikingly enough it seemed that even young pupils are, to a large extent, aware of the various learning activities that are documented by educational and learning research" (p. 512). This is consistent with the findings of McPhail, Pierson, Freeman, Goodman and Ayappa (2000) from their ESM study of the role of interest in fostering 6th graders' identities as competent learners. Detailed statistical analysis of the 6th grade students' preferred learning methods and their preferred choices of topic for study across the domains of science, drama, movement and animals, found "unity" (p. 63) between their preferred ways of thinking and doing and the structure of their preferred domains. For example, 6th grade students who preferred the science topic demonstrated a scientific approach in their preferred learning method as well in the activities they would normally find interesting and enjoy. In contrast the drama students generally preferred creatively acting and doing things as their preferred learning mode. These findings show that students' interest in their specific topic areas accurately conformed to the specific theoretical structures inherent in the specific knowledge domains (McPhail et al., 2000). These findings on children's epistemological awareness are significant for understanding the wisdom of the children as educational theorists in their own right, and also indicate their ability to be consulted and regarded as a resource in their own learning.

Oldfather (2002) used her 5th and 6th grade subjects as co-researchers in a collaborative study towards finding out about students' thoughts, feelings & actions when not initially motivated for reading, and how they might move towards becoming motivated. This was solely qualitative using observation and in-depth interviews. Ongoing analysis of the interviews "helped shape our understanding of important issues to be explored more fully in subsequent interviews" (p. 240). Structural analysis of the interview data yielded three types of motivation shifts. These were (1) evolving motivation where intrinsic motivation was shown to develop, (2) negative motivation, where the student reluctantly completed the task, and (3) non-motivation, where the student did not gain any motivation, and did not complete the task. "Students struggling with motivation experienced a range of feelings including anger, rebellion, anxiety, frustration and helplessness" (p. 247). For example "you've gotta do a geography map or something. Then you get real mad because you don't want to do it" (pp. 245-246). Another example related to not liking being timed, "it doesn't feel good when you see some other people get ahead of you and you hear somebody say, "Oh yeah, good, I'm finished". It just makes me feel like I'm so terrible at it" (p.

248). Other children reported feeling physically ill, or the need for physical release when sitting still, "well sometimes I just wiggle my toes" (p. 249). One of the children whose motivation did evolve said that if she "just starts to do it" (p.245) she eventually becomes involved. These qualitative findings are consistent with the findings relating to anxiety above. They also demonstrate the power of the verbal self-reports of students who are the same age as those in my inquiry.

Schank and Langer (1994) believe that young children do not have motivational problems, and they argue that is unlikely that a 2-year old would be depressed about a lack of progress or failure in learning. They suggest that all learning up until the age of 6 years is actually dependent on failure. However, dependence on failure may not necessarily be part of the belief system in the classroom environment, which children might adopt when they join the classroom. As noted by Herrenkohl, Palincsar, DeWater and Kawasaki (1999) "Students' epistemologies of science are problematic (because) they continue to perpetuate the "mistake stigma" (p. 455) in schools, a myth that runs deeply through the fabric of school life. Despite the widespread emphasis on constructivist approaches to learning, the object of schooling often seems to be to "get the right answer" (p. 455). Academic tasks and activities such as recitation, and worksheets, imply that there are right answers. This implies that mistakes are bad, they are embarrassing and the students (and teachers) who make them are not competent. Yet another implication is that if students are offered help or ask for help in order to *prevent* mistakes, the student being helped is obviously incompetent.

For example, in two studies of children aged 5 to 12 years, strong main effects were found for teacher or peer assistance on children's perceptions of student ability (Graham & Barker, 1990). Children as young as 5 or 6 years interpreted unsolicited help from the teacher to another child, as a low ability cue. Emotion-related attributions made by 7- to 8-year olds about this were that the helped student would feel less happy, and more sad and worried about their academic outcome. Preference for working with students who do *not* receive help from the teacher (despite being unsolicited) increased with age. This suggests a learned attitude and has implications for group task engagement in the classroom, where anecdotal experience finds that children do become irritated with needy peers. Yet as Herrenkohl et al (1999) argue, mistakes have been crucial to the development of scientific knowledge, as important insights are often developed as a result of errors or chance. This perspective has yet to filter through to the elementary school classroom.

Young children's feelings about school were studied by Valeski and Stipek, (2001). Multiple sources of data were obtained from 225 kindergartners (119 girls, 106 boys), and 127 first graders (56 girls, 71 boys) across 233 classrooms in 138 schools. Data came from direct assessment of their achievement and feelings about school, teacher questionnaires, and classroom observations. They used the FAS (Feelings about School) measure having adapted the Likert Scale for the age group, with the Interviewer also assisting the child. For example, one question asked, "how fun are the things you do in school?" The child could indicate "very fun" at one end and "not at all fun" at the other end. Standard test results for achievement level were also obtained.

Valeski and Stipek's (2001) data were subjected to a Varimax Factor Rotation to assess the items in the FAS and the dimensions of children's school-related perceptions. Four factors were extracted, namely perceived competence in math, perceived competence in literacy, children's feelings about their relationship with the teacher, and children's general attitudes towards school. To assess grade and gender differences, ANOVA's were performed. A significant main effect was found for perceived competence in both math and literacy. First graders had significantly more positive perceived competence in math and literacy than the kindergartners. In addition "a significant gender main effect was found for the relationship with the teacher sub-scale. Girls regardless of grade reported more positive feelings about their relationships with the teacher, than did boys" (p.1206). No other significant relationships were found. Citing previous research that found that "positive relationships with the teacher promote[d] relatively greater engagement in academic activities and better learning" (p. 1209), they suggest a need for research into whether "boys' less positive perceptions of their relationships with their teachers undermine their academic engagement and achievement" (p.1209).

Brophy (1999) takes issue with the term "fun". His argument is that "the point of schooling is to help students learn, not just to see that they have fun" (p. 2). Brophy (1999) is also concerned that accommodating children's preferences might do them a disservice and reduce their achievement. He prefers the terms, meaningful, satisfying, or worthwhile to "fun" for describing intrinsic motivation (p. 8). An alternative perspective is that this is a vocabulary issue and can be explored by understanding what the students mean when they say "fun". For example fun appears to be a correlate of interest in tasks (Herrenkohl, Palincsar, DeWater & Kawasaki, 1999; West, Hailes & Sammons, 1997). If fun were to equate with enjoyable, then McPhail et al's (2000) findings would also be reassuring about the meaning of fun.

First graders were the subjects in Rader and Hughes' (2005) experimental procedure to induce positive and negative affect and then assess the performance of 36 1st and 2nd grade children between 6 and 7.9 years of age. Using criteria based on Ashby, Isen and Turken (1999) for reading material to induce emotions, the book entitled "Lost" was used to induce both happy and sad affect. A separate piece specifically written by one of the researchers was used for neutral state. To obtain self-report data the Facial Affect Scale (Careseo & Cohen, 1998, in Rader & Hughes, 2005) was used. The Facial Affect Scale (also frequently abbreviated to FAS, therefore not to be confused with the FAS above) provides a five-scale range of happy through to sad faces for children to colour in at nominated times during the experiment. Similar in principle to the experience sampling method (ESM) (Csikszentmihalyi, 1975), the children were requested to colour in the facial expression that applied to how they felt. The mood having been induced, the children then attempted the cognitive task - a puzzle task selected from the WISC test. Statistical analyses showed significant effects for affective condition on the scoring of their performance of the task. Least significant difference post hoc tests found that the happy condition was significantly different from both the neutral and sad conditions. The implications identified by these researchers in their brief report are: that educators and school psychologists should take note of this finding because affective state impacts children's performance on a one-off task used to measure IQ. This has further implications for test conditions, indicating the need to create positive affective states to support higher cognitive performance (Rader & Hughes, 2005). One important issue raised by my research is whether it is ethical to induce sadness in children for experimental purposes. For example, significant differences were found between the neutral and happy conditions, indicating that future research along these lines would not actually need to induce a negative emotion in order to demonstrate the effect of positive mood in children.

A more extreme example of negative mood induction is evident in the "abstract only" findings of Rice (2003). This detailed abstract reports the findings of an experiment to examine the effects of sadness and emotion regulation on children's memory for educational material. One hundred 7-year old and one hundred 10-year old children were the subjects. Sadness was induced through watching a sad movie, neutrality assumed to be induced or maintained by watching an emotionally neutral movie. The children then watched an educational movie. The abstract reports that children who experienced the most intense sadness had poorer memory for the details of the educational movie compared to the children not reporting any sadness. Following this phase the children were instructed to regulate their sadness through either emotion problem solving or emotional suppression through reappraisal, while a control group was given no instructions. The

abstract reports that those suppressing their emotions had enhanced recall of the educational material compared to those who had no instructions. The abstract concludes that asking the children to *suppress* their sadness "in response to events that pose no personal threat *improves memory* for subsequent emotionally neutral information". The abstract does note that this is contrasted with the highly negative consequences of continually suppressing emotions stemming from traumatic experiences (Rice, 2003, p. 5552).

While acknowledging that this is only the abstract (Rice, 2003), there are several ethical issues to consider. Firstly it appears that no account was taken of the individual children's history or pre-conditioned emotions that might have been triggered unconsciously by the sad movie. Can we assume that no personal threat would be posed? As will be discussed in the methodology chapter, researchers must not cause harm, which to me would include any deliberate induction of intense sadness. Aside from that, there is an implied assumption that the children had not previously encountered the content of the educational movie, in other words they had no prior knowledge of any of the content at all. (Similarly, we do not know whether any of the children in the WISC experiment (Rader & Hughes, 2005) might have done the WISC puzzle before.) Finally, there was no mention in Rice's (2003) abstract of re-instating positive emotions as a way of "de-toxing" the sadness at the end of the experiment. As we shall see in the ensuing literature review, children already experience more negative emotions in school settings than is optimal.

Pekrun (1992) suggests two main reasons for assuming that situations of learning and achievement might induce "a great number of different emotions" (p. 361). If we assume that emotions function as human reactions to important events, learning and achievement situations may be very important parts of a student's everyday life. Secondly, settings of learning and achievement can be of individual or social nature, hence will be assumed to induce a variety of both self and task-related emotions, and of social emotions (Pekrun, 1992). Task-related emotions might include enjoyment or boredom as experienced during the learning process, and may be either prospective or retrospective. Prospective emotions include hope, anticipatory joy or the contrasting negatives emotions of anxiety, hopelessness (resignation/despair). Retrospective emotions include relief, outcome related joy, pride - and sadness, disappointment, shame or guilt. Social emotions include gratitude, empathy, admiration, sympathy/love, and anger, jealousy/envy, contempt, antipathy/hate. Social emotions may be consequences or correlates of group learning tasks.

More recently Pekrun, Goetz, Titz and Perry (2002a) reported the results of their thorough literature search on academic or school-related emotions, originally between 1974 and 1990, followed by a search through PsycINFO for the decade of the 1990's. They found that most studies had been conducted using traditional methods and generally "addressed no more than one or two emotions, implying that a broader perspective on a range of emotions was largely lacking in much of the empirical research to date" (Pekrun et al, 2002a, p. 92). Pekrun et al (2002a) propose the category of "academic emotions" (p. 91) to include the full range of emotions that are "directly linked to academic learning, classroom instruction and achievement (e.g. enjoyment of learning, pride of success, or test-related anxiety)" (p. 92).

Pekrun, Goetz, Titz and Perry (2002a; 2002b) have twice reported their more recent extensive and thorough series of studies to investigate contents, sources and functions of the academic emotions of both secondary school and university students. Their first significant finding was that students reported a wide range of emotions in academic settings. They state:

> There was virtually no major human emotion not reported by our participants, disgust being the notable exception. Emotional diversity implies that theory-driven approaches to students' emotions that limit the range of emotions considered for theoretical reasons may be in danger of missing important parts of students' affective experiences (Pekrun, Goetz, Titz & Perry, 2002a, p. 93).

Other findings from Pekrun et al (2002a) included "meta-emotions" (p. 93), which they explain as students' feelings about their feelings. For example some students reported feeling angry about feeling anxious before exams. This anger in some cases helped the students find ways to cope with their anxiety. This finding is consistent with Oatley's description of secondary emotions reported earlier (Oatley & Johnson-Laird, 1998). Of interest, Pekrun et al (2002a) did not cite Oatley (1992) at all. Pekrun at al (2002a) also found "academic boredom" (p. 93) which resulted from task demands being too low in relation to students' self-report of their abilities resulting in daydreaming, or from demands being too high and students having trouble keeping up. Daydreaming and boredom were suggested as serving the function of "escaping behaviourally or mentally from situations not providing sufficient stimulation (or from) having demands beyond the students' capabilities" (2002a, p. 94). These findings are consistent with those of Larson and Richards (1991).

"Positive emotions related to learning and achievement have rarely been analysed" (Pekrun et al, 2002b, p. 149) (Pekrun, Goetz, Titz, & Perry, 2002b), apart from the research tradition arising

from Weiner's attribution theory (Weiner, 1985). In their series of studies, Pekrun et al (2002b) were particularly interested in the classroom antecedents (or origins) of emotions. The first study of the series was of university students' retrospective reports. Findings included: positive emotions (their categories of process, prospective, retrospective and social emotions, which did not include happy) occurred no less frequently than negative emotions. "Concerning the major categories of emotion, 37.5% of all reports pertained to negative emotions, but no less than 40% to positive emotions" (2002b, p. 152). Positive emotions included enjoyment (13.7%) and curiosity/interest (4.1%). The frequencies varied according to the specific activity. For example the percentage frequency of positive emotions during studying was 57.2% compared to attending class at 52.3% and taking tests or exams at 31.2%. This might reflect structural and functional differences between these situations. One might expect university students to enjoy studying more so than actually taking the test and possibly more than elementary school students would. Interview data confirmed that "emotions were systematically connected to cognition, motivation, physiological changes and interaction patterns" (2002b, p. 152). This systematic connection is consistent with the findings on task engagement above. From these exploratory findings, four positive emotions (enjoyment, hope, pride and relief) and five negative emotions (anger, anxiety, shame, hopelessness and boredom) were selected based on their frequencies of occurrence and their theoretical relevance. These emotions were then used in the Academic Emotions Questionnaire (AEQ) – a multidimensional instrument that Pekrun et al (2002a, 2002b) designed themselves, derived from test anxiety questionnaires, to measure the more important academic emotions in domain specific ways. They made two versions, one for measuring trait emotions and the other for measuring state emotions. For example they were able to measure *trait* test anxiety across the course and assessments, as well as *state* test anxiety experienced within single episodes of academic life.

Confirmatory factor analysis was then conducted, with findings including some structural differences between traits such as between boredom and test anxiety. Four clusters of emotions emerged. These were (1) enjoyment, hope and pride, (2) relief, (3) anxiety, shame and hopelessness, and (4) anger and boredom. These clusters suggest that the emotions they included and measured "can be grouped according to their antecedents" (Pekrun et al, 2002a, p. 96). The specific emotions clustered will of course reflect the specific emotions included on the measurement tool in the first place. However they found that these clusters related similarly to variables of students' learning and achievement across both the university and secondary school settings. Parts of their model were then tested against a series of cross-sectional longitudinal

data, including the students' diaries. Antecedents were identified from the diaries, which meant that they were reflective and not on-line. When they later calculated within-student correlations for exam-related emotions specifically, they found a number of individual differences. For example, daily anxiety negatively correlated with motivation to learn for some students, whereas it correlated positively with motivation for others, suggesting that some students "may even profit motivationally from their anxieties, whereas others are handicapped" (p. 100).

Based on their trait and state results, Pekrun et al (2002b) recommend that researchers "complement sample-based analyses of students' emotions and learning by idiographic analyses to test the generalisability of sample statistics to individuals" (p. 100), preferably not trading off one against the other, but using a combined idiographic-nomothetic approach. They also recommend that "it would pay to attend their antecedents (of positive emotions), and to make an attempt to enhance them by educational intervention and in ordinary classroom instruction" (Pekrun et al, 2002b, p. 165). The variations in state emotions and the implied variations in their antecedents indicate that the quality of classroom instruction appears "to exert direct effects" (p.166). For example, citing Weiner (1985) they remind us that positive feedback can foster positive academic emotions, with positive emotions in turn fostering achievement, creating a loop (p. 168).

Boekaerts is another researcher of school-based emotions, who has also contributed enormously to our understanding of mainly negative academic emotions. Her most relevant findings for my research question are those on stress, anxiety and anger - including individual differences by achievement and gender, trait versus state differences, and the utility of complex measurement tools such as her own On Line Motivation Questionnaire (OMQ) (Boekaerts, 2002), which will be discussed shortly. Boekaerts' original research interest was children's anger especially those children who appeared to have trait anger, in that they tended to be always or frequently angry. Boekaerts believes that emotional support should be provided at elementary school level. For example, 29% of fifth grade students in The Netherlands attended the school doctor with psychosomatic complaints (Boekaerts, 1993). These complaints strongly correlated with the intensity of their reported negative emotions as per Boekaerts et al's (1990, in Boekaerts, 1993) Stress and Coping Scale, derived from Lazarus and Folkman's coping theory. Based on structured interviews with 10- to 12-year olds in the classroom, Boekaerts constructed a list of 42 unambiguous, stressful situations, such as upcoming exams for which they were not prepared, having too much homework, or conflict with either the teacher or fellow students. Next the

students did a card-sorting task on the stressful situations rating them on a 4 point Likert Scale. Principal components analysis found four separate domains, two of which pertained to academic situations and two pertained to social. Then from each domain the two most frequently selected situations were selected and students interviewed again about their coping strategies. These coping strategies were then factor analysed into approach and avoidance, and tested against a number of variables.

For children aged 11 to 13 years, social conflict situations were more frequently experienced than academic problematic situations. Students reported more anxiety in problematic academic situations than in social conflict, whereas they reported more sadness and anger in social conflict than in academic situations. Students also indicated more approach and less avoidance in academic situations than in social situations. But boys - especially younger boys - reported more avoidance behaviour than girls. Anxiety facilitated approach and had no effect on avoidance - similar to earlier findings cited by Boekaerts (1993, p. 160). Intelligent students approached more and avoided less than less-intelligent students. Frequently experiencing taxing academic demands predicted low academic achievement measured by Grade Point Average (GPA) and frequently experiencing anger in relation to these taxing academic demands increased psychosomatic complaints. When students used avoidance strategies in academically taxing or demanding situations, psychosomatic complaints reduced. When anger was experienced, it facilitated avoidance in the academic demand situation. Basically Boekaerts argues that "students are walking a tightrope" (p. 154) between mastery and coping. In mastery mode they have found their balance while in coping mode they have temporarily lost their balance.

Boekaets found that "an essential feature of these situations is that they are not isolated experiences. Students expect these situations to occur; they can describe them and give causal explanations for their occurrence" (1993, p. 161). When confronted with a stressful learning situation, students are required to both master the new learning or skill, and deal with any negative emotions and intrusive thoughts arising prior to or during task performance. "At such times the mastery mode and the coping mode may be highly incompatible" (1993, p. 164). But this might not necessarily lead to avoidance, with either approach or avoidance depending on the "perceptual set" of the student. A negative perceptual set (similar to the negative schema identified by Ellis, Varner and Becker, 1993) might "choke" (p. 164) the student's response, through having approached to no avail. For example, if a student has tried once unsuccessfully, an existing negative schema or perceptual set might prevent further attempts. Depending on how

students interpret the situation, the student's negative appraisal might lead to either a coping intention in the form of seeking social support to change the suboptimal learning conditions, "or to a decision to conserve energy rather than to expend resources to no avail" (Boekaerts, 1993, p. 164).

Another relevant aspect of Boekaerts' work is her measurement of trait-anger and trait-anxiety with the respective Dutch versions for several anger measurement instruments, which she then subjected to factor analysis. Four underlying factors emerged for 16 year olds, while three emerged for the younger students 10 – 13 years of age. Students also completed the "coping strategies" questionnaire designed by Boekaerts (1993). Factor analysis on the 40 items of the Anger Expression Control scale yielded three factors with eigenvalues greater than 1, explaining 40% of the total variance. These were anger-control, anger-out and anger-in. These were then tested against other anger measures and GPA. Findings include that "students who score low on anxiety have high GPA, irrespective of their score on anger-control. Students who score high on anxiety and high on anger-control have low GPA" (p. 278). The main finding is therefore that, "anger-control is associated with low GPA for anxious students. It has no effect otherwise" (p. 278). "When anger control is studied in relation to anxiety, the results lend support to the hypothesis that conflicting action tendencies resulting from two different negative emotions have a detrimental effect on GPA" (p. 279).

As Lazarus has theorized in his core relational themes, the dominant action tendency in anxiety is avoidance, whereas in anger it is primarily attack (Lazarus, 1991; Boekaerts 1993). Coping with these conflicting action tendencies "may involve heavy cost in resources that are taken away from the task" (Boekaerts, 1993, p. 279). As Boekaerts sums up, "it seems the conflicting coping strategies in social and academic situations may harbour the risk of having low GPA at the end of the year" (1993, p. 279). Anxiety prone students who are frequently angry in class are at risk. Anger or anxiety may prompt students to turn off to avoid their emotions, and thus avoid the detrimental effects of high anxiety and anger, such opting out to avoid stress then probably depriving them of opportunities to master the task (Boekaerts, 1993), consistent with other findings cited earlier.

Based on their many studies, Boekaerts (2002) eventually developed the on line motivation questionnaire (OMQ). The OMQ is "an instrument to register situation-specific motivational beliefs (appraisals) and emotions... guided by Stress and Coping theory" (p. 80). This

questionnaire is based on Boekaerts' model of adaptive learning, and has been used in several of their own and others' (for example Ainley and Hidi, 2002) studies. While the OMQ seeks some information on emotion, its main purpose is the role of appraisals across several variables relevant to motivation, such as perceived difficulty of tasks, attributions about perceived difficulty of the task and effort required, and so on. It now includes in its total of 44 items, six items to probe emotions, worded for example as, "How do you feel now?" Students answer by rating along a 4-point scale, for example "nervous through to not nervous, happy to not happy. Relevant findings on gender include boys scoring generally higher on emotional states before and after doing a math task, reporting "feeling more at ease and more enthusiastic before and after the task" (p. 111), while girls report more persistence after failure. Girls also attribute a poor result to lack of personal capacity and level of difficulty more often than boys do. With reference to context, Boekaerts' (2002) found that students' appraisals of the learning task and its contexts "mediate between domain-specific motivational beliefs and the students' emotional state and their intended and actual effort investment" (p. 79).

The OMQ questionnaire has also been analysed as to its utility. Boekaerts (2002) refers to its intention as an experience sampling technique that reliably captures "students' cognitions and feelings in relation to the specific task without disturbing their task focus" (p. 113). The most relevant finding for my PhD inquiry is that students below the age of 11 years needed help to complete it. Problems included the vocabulary and also the time required for filling out, generally up to 25 minutes in total (including pre-task and post-task sampling). Those participating need to be taught the OMQ and to have time to practise it up to three times on average before actually completing the form for the research. This confirms that despite the wealth of data obtained, using complex instruments would not be feasible for the 9- to 11-year old children in this PhD study. It would definitely take too much time out of the task being sampled for the immediate report on "how I feel right now". Repeated practising might also introduce a practise effect variable.

The research presented so far has demonstrated the range of emotions experienced in school contexts, in conjunction with details as to the many and varied methodologies. It appears that any or all of the full range of positive through to negative emotions may be possible in academic settings, across the age span. So far we have seen a higher than desirable rate of negative emotions occurring for children in academic settings, along with their negative outcomes. In research using both quantitative and qualitative methods (e.g. Pekrun et al, 2002a, 2002b;

Boekaerts, 2002), more information has been obtained as to the nature of the antecedents. While there is excellent evidence of the types of antecedent variables that are relevant to these emotions, the research presented so far has not been able identify specific antecedents for specific emotions as they are occurring at the time.

The literature presented in the next section includes research using a variety of on-line methods for eliciting student emotion data. I have grouped these together because they move us a little further towards identifying specific contexts or antecedents associated with the emotions and with learning.

Contexts – Finding Emotion Antecedents

Gad Yair (2000) used an experience sampling method (ESM) (Csikszentmihalyi, 1975) to investigate students' low mood, lack of motivation and sense of failure during instructional units. Using the ESM data, Yair (2000) decided to focus not only on the aggregate data, but to also use "a within-student experience-level unit of analysis, thus allowing more flexibility and accuracy in the estimation of the effects of the structural characteristics of learning tasks on students' learning experiences"(p. 198). The data used for these analyses were from secondary analyses of data collected during the first year of a longitudinal study, the Sloan Study of Youth and Social Development, a U.S. national longitudinal study begun in 1993, studying how adolescents think about their futures. Data were randomly selected from elementary and secondary school levels, resulting in a sample from 33 schools, 865 students (Grades 6 – 12) and 28,193 experiences. Of the full sample, approximately 20% of the children were Grade 6, the same level as the 10-year old children in my inquiry.

First, a confirmatory factor analysis was done to test a theoretical model of students' learning experiences, obtaining a four-factor result – control mood, active mood, intrinsic motivation and sense of accomplishment. "The CFA analysis produced a highly correlated four-factor structure" (Yair, 2000, p. 200), two factors of which depicted students' emotional mood while learning, these being control mood and active mood. Control mood includes students feeling secure, content and in command of their learning, while active mood estimates students' expressive outgoing feelings while learning. These four factors were then tested against a series of independent variables based on the reform assumptions that Yair (2000) was interested in, such as authenticity of tasks, and students' choices. Fourteen items were included in the measurement

tool with the specific emotions of relaxed, proud, happy, excited, enjoy, interested. Specific results from ordinary least squares (OLS) testing the two mood factors of relevance to my thesis include: Grade level and gender negatively correlated with the sense of active mood. Students in the upper levels reported less of an active mood while learning, as did girls. Choice was the most highly correlated variable with control mood. Also authenticity of the activity significantly predicted students' control mood while learning. Girls reported a lower control mood while learning than boys. Yair (2000) then selected the best and worst learning experiences (statistically via 1 standard deviation above and below the mean) of all four dependent variables of skills, challenge, choice and authenticity for further analysis. The structural characteristics of high quality experiences were found in "authentic settings, in cases where learning is relevant to students' goals" (p. 204), these settings requiring skills to be exhibited, allowing more autonomy and free choice. Yair (2000) explains that "the Chi-square was probably inflated by the large *n* of the study" (p. 200).

By analysing structural antecedents of students' learning experiences at the experience level, Yair (2000) has confirmed his hypothesis that academic stimulation occurs "in instructional units that are authentic, choice-driven, and demand skills" (p. 192). In the absence of these characteristics, students are bored and emotionally depressed. Such events are "overwhelmingly represented in students' daily school life"(p. 192), and there are not enough events "that spark their hearts" (p. 192). For example, only 21% of 4295 learning experiences within the total ESM sample were highly challenging. Yair (2000) recommends that tasks with low authenticity and few choices should be minimised. Brophy (1999) agrees that learning tasks need to be authentic. "Authentic activities require using what is being learned in school for accomplishing the very sorts of life applications that justify inclusion of this learning in the curriculum in the first place" (Brophy, 1999, p. 22). Tasks that "spark the heart" (p. 192) should occur more frequently (Yair, 2000). Considering that the heart is the traditional symbol for emotion (Averill & Nunley, 1992), we might expect that sparking the heart might also more readily access motivation and cognition.

Yair (2000) also argues that traditional approaches to teaching "tend to blame either school or students" (p. 206). This is consistent with the concerns of Lazarus (1991) and those arguing for idiographic or state versus nomothetic or trait perspectives on emotional experience. Blaming the student also ignores "the fact that a student may be exposed to extremely different learning experiences within the span of a single school day" (p. 206). Yair also argues that ignoring this variability will rely on research analysis at the aggregate level only. Allowing for and researching

the within-student variability will encourage reform efforts at the individual level. For example "one need not wait for whole-school reform" (p. 206), nor even re-educate students. All that is needed is to make instruction more relevant, allow more choice and make greater demands on students' skills. These points raised by Yair (2000) draw attention back to the importance of classroom context. Changing the context and hence the antecedents can be done at classroom level.

Fluctuations in emotional daily states have been the subject of a number of studies using ESM. For example, Larson and Lampman-Petraitis (1989) used ESM in their study of the hour-to-hour range of emotional states of 9- to 15-year olds. They were interested to see if they could demonstrate earlier research findings that adolescent children experience both stronger and greater extremes of emotions in their daily lives than do adults. They wished to determine whether these differences were real, or simply reflecting age differences in response styles. For example, rather than actual experience, the different results across ages might reflect age changes in the use self-report mood scales. Research on response styles they cited indicated that - with age, children and adolescents use less extreme scale points in rating ambiguous stimuli – so it is possible that differences reflect nothing more than a change in response style (Larson & Lampman-Petraitis, 1989). Eight waves of data collection occurred over two years, with 473 randomly selected children and adolescents from four suburban neighbourhoods in the Midwestern USA. ESM procedures were used, with a total of 17,752 ESM signals responded to. Students rated their emotional states or moods on a 7-point Likert Scale. Face icons were also included for rating to provide a concurrent alternative response mode. The responses were along the dimensions of pleasure-displeasure or affect (happy-unhappy, cheerful-irritable, friendly-angry, alert-drowsy, strong-weak, excited-bored).

Larson and Lampman-Petraitis's (1989) analyses were based on aggregated scores, computed for all of the self-reports provided by each person. The unit of analysis was the person, not the individual time sample. Their data were analysed by a series of parallel multivariate analyses of variance with grade or year level as the independent variable and the self-reports and ratings of faces as the dependent variables. To test differences in emotional variability, MANOVA were performed with grade as the independent variable and students standard deviations on each of the six self-ratings scales as the dependent variable (p. 1253). Neither boys nor girls showed an increase in the frequency of extreme negative or positive states. Gender differences found were an association between grade level and standard deviation scores for girls just beyond

significance, and significant age trends in average daily emotional states for both boys and girls. Based on the series of analyses presented, they conclude that apart from the trend for girls to increase in happiness and cheerfulness, the older participants experienced "less positive average daily states" (p. 1255).

Larson & Lampman-Petraitis's (1989) findings indicate that although there were no significant differences in variability of moods, the onset of adolescence did relate to a reduction in average mood for both genders. As the authors also conclude, this might reflect a number of variables such as age-related differences in their interpretations of their emotions, their vocabularies, or real changes in emotions experienced. They recommend that "future research would be needed to investigate the causes and consequences of these alterations in daily experiences" (p. 1258). The authors acknowledge that a number of normative changes in adolescence such as life stressors, hormonal changes, relationship and communication issues, parental issues and so on may be relevant variables associated with specific reporting events. Any or all of these might have been part of the environmental antecedents at the time, but not factored in for this study. As more recent researchers (for example Yair, 2000, Pekrun et al, 2002a, 2002b) have also confirmed, aggregated methods eliminate any information about antecedents for specific emotion experiences.

Larson and Richards (1998) also used ESM to study the weekly fluctuations of emotions in adolescents. Similar to Libby's quote at the beginning of this PhD thesis, they open their report with the following statement from a college freshman:

> In high school Wednesday is like, horrible. You've got all this stuff to do, and it's not that close to the end of the week (Larson & Richards, 1998, p. 37).

This student was older than Libby, yet expressed the same weekly rhythm, with Wednesday sounding like the "absolute pits" of the week. In this study, Larson and Richards, (1998) were interested in the weekly rhythms of adolescents, as to how they might reflect that of the collective social group. For adults in western society, "social rhythm is embodied in the separation of the week into weekdays and weekend" (p. 38). This used to be the case in New Zealand, although 24-hour trading and longer "opening hours" for wining and dining have modified this perspective from earlier decades. However elementary school schedules in New Zealand do continue to operate in a weekly rhythm, with weekend school or night school educating a different and usually adult cohort. In the USA "the high school years have been described as a period of

boredom and alienation from school, even for high-achieving students" (Larson & Richards, 1998, p. 39). Based on the students' quotes it would seem that little has changed since William James (1890/1950) and others noted the significant role played by the clock and the calendar in ordering our daily social and psychological lives (Larson & Richards, 1998). Larson and Richards' (1998) subjects were 220 youths at two different stages of development, Time 1 between 5th and 8th grades, and Time 2, between 9th and 12th grades. The younger sample captured a cohort similar to the subjects for my inquiry. They used multilevel modelling, which takes account of their 16,427 ESM events coming from 220 subjects, and Z-scored values for affect and excitement-boredom. The strongest differences in the data occurred across 8th to 9th grades. As a result nearly all their comparisons focus on differences between 5th – 8th grade period and 9th –12th grade period (p. 40). Changes in the emotional experience of the week were found and graphed.

Briefly summarising the graph of age changes (Larsen & Richards, 1988), Monday's affect score was lower than Tuesday's, affect dipped again on Wednesdays increasing a little on Thursdays, but still lower than Monday or Tuesday, to a peak on Fridays. Saturday was the highest peak for the week and on Sunday affect dropped again. Comparing the age groups, 5th to 8th grade affect scores demonstrated less variability but dipped lower on Sundays. Measures of "excited" were then graphed by time of day. A gradual increase in "excited" was demonstrated as the day progressed, with 5th – 8th graders "excited" levels peaking at lunch time, then dipping down between 2 and 3pm, then peaking highest between 4 and 5 pm. The older students did not demonstrate a lunch-time peak, with lunch-time being part of the gradual build up to a peak at 2-3pm, then a higher peak than younger students at 4-5pm also then gradually reducing. This study's relevance is similar to the previous one of Larson and Lampman-Petraitis's (1989) in that children of ages similar to the subjects for my inquiry do report both daily and weekly changes in positive and negative affect, and more specifically – excited. While the aggregated results are useful in providing general trends, information on which specific variables are relevant is not available. It might not be unreasonable to hypothesise that going home from school is the highlight of the day, with the next highlight being lunch break.

Weekly fluctuations with a dip on Wednesdays were also found in an earlier study by Egloff, Tausch, Kohlmann, & Krohne (1985), who used the PANAS (positive and negative affect scale) over a single week with 49 university students. Positive affect for two separate factors of activation and non-active showed a similar weekly pattern as the children's one in the Larson and Richards (1998) study. Positive affect dipped on Wednesday, but dipped further on Thursday then

went up for Friday and Saturday. However, the study was only for one week, and they were mainly assessing the utility of the instrument (Egloff, Tausch, Kohlmann, & Krohne, 1985).

More recently, Csikszentmihalyi and Hunter (2003) analysed the ESM data drawn from a focal group of 1215 youth from the Sloan Study (Yair's, 2000 sample also), to specifically study their experiences of happiness both across the week and throughout the day. The weekly and daily fluctuations in happiness experienced by the 6th through to 12th graders were similar to the positive affect findings above. The lowest level of happiness was reported on Sundays, with a significant drop to the lowest level of the week on "Blue Mondays" (p. 189), followed by a gradual increase towards the end of the week with the highest peak being seen on Saturdays. The levels of happiness on Tuesdays and Wednesdays were almost identical, thus differing from the Wednesday results above. Daily happiness gradually increased throughout the morning, peaking at noon, then by 1.30pm dropping down to a level lower than late morning, followed by a peak level at 4.30pm.

Csikszentmihalyi and Hunter (2003) then calculated the mean levels of happiness as reported during the ten main weekly activities of the teenagers, to find that the highest level of happiness was reported when talking with friends, and the lowest level was reported during homework. Categorising these activities differently they demonstrated that "whenever students are involved with school-related activities, their happiness level is below average, when socialising with friends, when involved in active leisure or in passive leisure, it is above average" (Csikszentmihalyi & Hunter, 2003, p. 191). Other findings included the highest level of happiness during sports. When adolescents were with companions, their levels of happiness were significantly higher than when alone, or with teachers or with classmates. Significant differences related to demographics included happiness being significantly higher for working class youth, with upper middle class youth reporting the significantly different lowest rate. Happiness decreased during the teenage years reaching its lowest at 16 years, but improving by 18 years of age. There were no gender differences.

Csikszentmihalyi and Hunter (2003) conclude that what a person is doing and who one is with does modify a person's happiness, indicating a state or situational perspective. To find out from a trait perspective what experiences "differentiate a happy young person from one who is less so" (p. 194), they also conducted a series of regression analyses with mean level of happiness (person-level) tested against all the mood variables. They found that "the strongest predictor of

trait happiness was how Excited vs Bored a person felt"(p. 194). This is consistent with Lazarus's (1991) view of state versus trait. For example, repeated experiences of situated excitement would be more conducive to more happiness than repeated situations of boredom. Csikszentmihalyi and Hunter (2003) conclude:

> It is difficult for a young person to be happy, when living in a sterile suburb that lacks opportunities for action, forced to attend schools where there is little chance to express oneself except in abstract intellectual terms, surrounded by a small nuclear family that is seldom together and relaxed enough, to interact freely (Csikszentmihalyi & Hunter, 2003, p. 191).

It is interesting to note the triangulated findings from Csikszentmihalyi and Hunter's (2003) analysis of happiness and Yair's (2000) analysis of instructional tasks on the same ESM data. They have each confirmed the other's findings. Yair (2000) found an over-representation of boredom from analysing the school-related situational variables, and Csikszentmihalyi and Hunter (2003) found the significantly lowest levels of happiness during school related activities. In conjunction with the other weekly and daily ESM studies discussed here, the weekly patterns of the days and the weeks seem to reflect a consistently tedious life, with highlights being those regular or typical breaks for lunch and the weekend – at last.

The ESM research presented in this section has been able to more closely identify the types of antecedents to children's and older students' emotions. Yair (2000) has compared the types of tasks that contribute to positive or negative emotions, also providing evidence that the occurrence of negative emotions far outweighs the positive. Time sampling across different groups strongly points to time spent in school as more emotionally negative than positive, with positive emotions more frequently experienced outside of school times and activities.

This group of findings suggests a significant role for context in students' emotional experiences. A consistent theme seems to be the higher frequencies of negative emotions associated with school activities, with the middle of the week having the lowest rate of positive emotions across the ages. In the next section I report the findings from similar research, but which has also included specific attempts to identify more accurately the types of events and emotions associated with successful learning. The students in the next section are older than the present sample, reflecting the limited research findings to date from investigating children's emotions in the present age group.

Contexts – Linking Emotion to Learning and Achievement

Nicholls, Jones, & Hancock, (2003) investigated the relationship between students' perceived learning and emotion, motivation and goal orientation, and the types of instructional strategies teachers use most often. Included in their rationale they state:

> Experienced educators of the 21st century realise that cognitive processes and emotions intersect in the classroom in a powerful way with the emotional domain often driving the successful growth of cognitive skills (Nicholls, Jones, & Hancock, 2003, p. 57).

Their subjects were 26 8th grade students attending either science or English language classes, each student representing either content area over a 5-week time frame. Structured interviews with a stringent interviewing guide (for standardisation) were conducted prior to the five weeks, these data being intended to shed additional light rather than being the main data for analysis. Data was also obtained through detailed Student Learning Logs which included reflective questions on what was learned, how it was learned, level of satisfaction and so on. The researchers used deductive methods to categorise the themes emerging from these data. In addition, the teachers completed a Reading Instructional Features Questionnaire to elicit relevant data on their methods and perceptions as a triangulation for the log data.

To analyse their data quantitatively, Nicholls et al (2003) categorised their students according to their achievement and engagement in learning and statistically tested their data against emotions, motivation and goal orientation. Although statistically they found no correlation between emotions and students' perceptions of learning or achievement, the Learning Logs provided more detail. "High achievers indicated an emotional pattern that included no anxiety once the lesson was completed, some boredom with the lesson, little or no joy in the lesson, and some interest in the subject" (p. 70). The low achievers' results were similar. Statistical analyses of these negative emotions against actual learning achieved demonstrated no serious negative impact. While they obtained negative correlations between for example joy and boredom ($r = -.664$), joy and interest ($r = -.689$) and boredom and interest ($r = -.877$), these did not relate to the students' overall performance.

Nicholls et al (2003) found that their students felt neither real anxiety nor real excitement about their studies, which suggests that school might be similarly bland for these students as for Libby

(my subject) and others cited above (Larson & Lampman-Petraitis, 1989). Nicholls et al (2003) have suggested that other variables may be relevant. Perhaps the students may have been very comfortable in their environments, perhaps they masked their emotions, or perhaps the problem lay with the actual measure of achievement for their study. Achievement was measured by standardised test results, which might have had no relationship to what was being learned during the 5-week period of the study. They also suggest that perhaps another limitation was "the quantifying of qualitative data" (p. 76), as they had reduced the constructs to a Likert Scale of three, and lost "a tremendous amount of robustness" (p. 76), plus the sample size was small at 26.

Do and Schallert (2004) also took the "intertwining of cognitive, social and affective processes" approach to their research design for their investigation of: "The role of affect, in its dynamic interaction with motivational and cognitive processes as students engaged in classroom discussion" (p. 621). Similar to the theoretical perspective of my thesis, they decided to be "more inclusive rather than precise" (p. 619) in their use of the terms mood and emotion, because they were "interested in all the different kinds of affective states (that) students might experience" (p. 619) during classroom discussions.

Acknowledging the methodological challenges due to the multilayered and frequently short-lived nature of emotion, Do and Schallert (2004) also took an interpretive approach. Their subjects were 16 senior college students (15 females and 1 male), and data collection included observation, video recording, a series of assessments at regular intervals throughout the full-semester study (including self-esteem, mood, and communicative adaptability), reflection meetings where students also completed the assessments, and stimulated recall video-cued interviews. Using grounded theory coding methods, Likert Scale data were analysed and categorised towards a proposed model of "affect as catalyst in students' experience of classroom discussions" (p. 623). In addition to the Likert Scale data, interviews elicited reasons for a student moving for example from feeling neutral (4) at the beginning of the class to feeling happy later on. They also found that students might also bring emotional states to the class, such as being sad about something that happened the day before.

Do & Schallert's (2004) study was an extremely comprehensive study, from which there were many findings relevant to my thesis, albeit the different age range. One group of more relevant findings related to students' listening, which was the main task in a discussion unless a student was talking. For example listening would be reduced if students were waiting for a gap in the

discussion to have their own say. If students "were experiencing positive affect, their attention to the discussion would usually increase enhancing the likelihood of deep listening to the next action" (p. 625). "Tuning out" (p. 626) was more likely in specific contexts, such as certain students speaking, certain comments, whether they thought the content was on track (although different students saw being "on track" differently) and other students that students might not like being the speaker. When the content was not interesting enough, students were more likely to "process the *social* rather than the *content* aspects of the discussion" (p. 627). Sometimes if students noticed they had been "tuning out" they might use strategies such as doodling to bring themselves back in to awareness.

Finally from this study (Do & Schallert, 2004), in terms of learning achieved, it was not possible to attribute a specific relationship between participation in the discussion and the final grades achieved by students. For example, one of the apparently contradictory findings was that the student who had mainly processed social content achieved the highest number of points for the course. This might suggest a positive role for social variables in learning, perhaps consistent with socio-cultural theory. Because the researchers were not able to specifically pin down the moments of learning, cause and effect was not identified or argued. This study is also useful to my research, in demonstrating that multiple methods are required when trying to identify antecedents. They also confirm the difficulties in using test results as evidence of learning.

Another more comprehensive study which did manage to find more specific antecedent events related to learning achieved, was the study by Laukenmann, Bleicher, FuB, Glaser-Zikuda, Mayring and von Rhoneck, (2003) on the influence of emotional factors on learning physics. This was an extensive qualitative and quantitative study, carried out in the second half of the school year of 1997/1998. The subjects were 652 8^{th} grade students across three different schools, with each school's physics classes having different content, yet comprising a similar structure with three lesson phases, namely acquisition, practice and a final more performance-oriented phase prior to the test. Their model of variables for the study categorised three sets of variables, namely the cognitive variables (including prior knowledge & cognitive emotional variables), emotional variables (including state well-being, state anxiety & state boredom, plus habitual emotions), and social variables (student interactions with peers and the teacher). In their model these are shown to interact with each other and they all influence performance. In applying their model they also distinguish trait components (biographically-developed) and the state or actual situational variables related to each particular lesson. Trait variables include a positive expectation of life,

general satisfaction at school, subject specific anxiety, interest and self-concept. This is a comprehensive model and incorporates similar components to Nuthall's (1999) model of learning. The state questionnaire was filled out by the students at the end of each of five pre-selected lessons, timed to obtain three measures during the acquisition phase, and two from the practice phase. The qualitative part of the study consisted of 12 female and 12 male students representing grade and achievement. These students were interviewed pre- and post-research study and kept a diary through out the 6-week study.

Correlations and factor analyses were conducted. "In case of positive emotions (interest and well-being) the correlations to the state variables are highly significant and higher than to the corresponding trait variables" (Laukenmann et al, 2003, p. 496), whereas the opposite was true for anxiety. For anxiety the trait variable was predominant, whereas for positive emotions the state variable was predominant. Using LISREL structural equation modelling they then investigated how previous knowledge (pre-test) and interest, general well-being or anxiety – differentiated into state and trait variables – influenced performance on the intermediate and on the final test. Prior knowledge, trait interest (general interest in the topic electricity) and state interest (situational) were combined into a joint factor and tested against performance results.

The results confirmed that interest was more important in the beginning acquisition phase of the learning when there was no performance pressure than when learning under performance pressure (Laukenmann et al., 2003). High trait anxiety was an inhibiting factor for performance, whereas situational anxiety had no effect on performance. "The quantitative results show a strong connection between well-being and interest in physics lessons; that is why the impact of situational interest and situational well-being are quantitatively comparable" (p. 503). Qualitative analysis included the diaries and the interviews with just a few of the findings as follows: High achievers reported more joy about the learning process especially learning at school. They also did physics related activities at home for their leisure, similar to the findings of McPhail et al (2000). The lower achievers preferred learning at home, but this was mainly review tasks and worksheets. The lower achievers reported more anxiety in both home and school about test failure with both groups worrying about learning failure at home or school.

Like Boeakaerts (1993), Laukenmann et al, (2003) also explain that the impact of anxiety is complex. Trait anxiety had a negative impact at acquisition and final practise stages. The interview data clarified that test anxiety was more prevalent for low achievers while learning

worries were prevalent for the high achievers. "Learning .. is not cold cognition. It is a process within which positive emotions promote achievement, whereas anxiety plays an ambivalent role" (p. 505). They suggest that each phase of a lesson should be treated differently so that the first stage picks up on students' interests, and this phase should be pleasant and relaxed. Small successes and competency should be achieved during the middle of the lesson. Prior to the final test, students should be proceeding towards success, so that control over anxiety can be exercised (Laukenmann et al., 2003).

The most useful aspect of these findings for my PhD inquiry is the benefit of being able to separate out state and trait. Also they were specific in their timing of the phases of learning sampled. They obtained more frequent samplings of data so that the different stages of a lesson could be measured. They were creative in their approach using multiple methods and were able to be more precise in the correlations of the emotions to demonstrate their correlation to learning and to specific learning events. As a result they have been able to move towards describing specific characteristics of successful learning events.

> The qualitative results show that experiencing joy in the physics lessons relates primarily to the successful learning process. Interest is also related to the learning process and not just the content. These joyful and interesting learning situations are characterised by individual experiences of cognitive engagement and competence. This is especially true for high achievers (Laukenmann et al, 2003, p. 503).

Another study that aimed at identifying characteristics of learning contexts, emotions and achievement was Peterson and Miller's (2004) study to compare two different classroom instructional contexts – large group and co-operative learning. This was a straightforward study using 94 undergraduate university students (70 women, 24 men) enrolled in four sections of a compulsory educational psychology class. They used ESM to compare the impact of smaller co-operative group versus large group contexts on students' cognitive-emotional-motivational dimensions. They also investigated whether students' level of prior achievement would be related to their experience of instructional settings. Two sessions only were sampled, one whole class and one co-operative learning session. Students were warned at the start of each session that they would be interrupted at some point during the session. Due to the broader setting being constant across the subjects (they were all in the same class) they adapted the ESM tool by focusing on the internal dimensions rather than the context or external dimensions. Questions on the three variables of emotion, cognition and motivation related to the specific context, also including the

students' own perceptions about their learning, such as how much were they learning, their answers being recorded on Likert scales. One relevant finding is that students reported higher levels of activation/potency during co-operative learning than during whole class instruction. Further statistical analyses found statistically significant evidence that more students were in flow (Csikszentmihalyi, 1975) during co-operative learning than during large group, and more students were apathetic during whole class than during co-operative learning.

Peterson and Miller (2004) concluded that instructional context was an important factor in the students' experience accounting for 47% of the variance. The only specific emotion finding was that students experienced more enjoyment of group work but this was not statistically significant. Prior academic achievement was also included in the various analyses, and accounted for 22% of the variance. Univariate tests on achievement showed that higher achieving students reported overall higher levels of cognitive efficiency, self-esteem and perceived skill. Higher achieving students had higher quality experiences regardless of the instructional context, and in the emotional dimension, higher achieving students had higher self-esteem.

Peterson & Miller's (2004) study is useful in that it has compared two specific experiences of the same group of students, yet once again, how or why higher achieving students enjoy certain activities more is not captured without locating the antecedents. The authors describe the group tasks for these psychology students as authentic, and acknowledge that their results might have differed if the task had been perceived as irrelevant. The whole class content was intended to facilitate the students' understanding of the psychological concepts covered in the group task, and if the whole group session had not been attended this would have impacted the group work hence their experience. The main implication from this study is that authentic carefully structured tasks can enhance the learning experience of university students. This might partly answer Yair's (2000) concern about the need for authentic tasks. A cautionary aspect of these findings is that despite the cohort studied being university students of psychology, higher achieving students enjoyed the classes more. This is similar to the experiences of some elementary school students in the research examples cited above. Does this suggest that lower achievers do not have optimal learning experiences to look forward to at all? Not even at university?

The research findings presented in this section demonstrate some of the difficulties associated with trying to link emotions and events or antecedents with learning achieved. Data collection needs to be related to specific events of interest. However, this still might not help "pin down" the

emotions during a learning moment. The study by Laukenmann et al (2003) took five specifically timed samplings, contributing towards a more accurate report on which emotions are optimal at which times. Other findings are mixed in that compared to Laukenmann et al's (2003) high achievers experiencing more joy, Nicholls et al's (2003) high achieving students were bored and merely demonstrated less anxiety. This may reflect the topic of study or any of the environmental variables. Alternatively it might reflect the measure used. Recall Nuthall's (1999) argument that classroom experiences themselves actually shape the mind, and that ability or achievement of student is the *result* of differences in their classroom experience not the *cause* of these differences. Therefore the hunt is still on towards finding a more specific link between learning and emotions and their classroom antecedents.

Some of the studies reported in this and the previous sections have identified some gender differences emerging, particularly with student anxiety and some with achievement. Gender differences have been also noted in the younger samples. A number of other studies have also been conducted with a more specific focus on gender. I shall report these in the next section.

Gender Differences

Altermatt and Pomerantz (2003) summarised their research findings on 932 students in grades 4, 5 and 6, and found that girls were more likely to agree with statements such as "I worry about doing well on tests in school" (p. 67) than boys. They acknowledge that girls tend to get better grades, so why should they worry. They found that experiencing failure put girls at high risk with low-achieving girls at particularly high risk for experiencing general anxiety as well as depression. They suggest that girls like to please adults more than boys do, increasing their vulnerability to fearing the disappointment of adults such as parents or teachers. This perspective is consistent with the findings of Valeski and Stipek, (2001) discussed earlier, in which girls were found to have better relationships with their teachers.

Gender differences in emotional masking were found in a study of 4-9 year old children. Cole (1986) found that girls attempted to control their facial expressions by smiling even when they were disappointed about not receiving a prize, whereas boys did not. This gender difference specifically related to the magnitude or fullness of their smiles. For example, girls' smiles were equally full when receiving the desired prize as when disappointed. Whereas boys who had smiled as fully as the girls when receiving the desired prize, smiled less when they were

disappointed. Limitations identified included the possibility that the previous wide smile from having received a prize initially, might have contributed to the current smile, or possibly might even have mitigated the disappointment. This study is of some relevance as it reminds us that children of this age might wish to mask their true feelings in the classroom context. It also raises the question as to why would girls mask their expressions more? Might this be part of maintaining their good relationships with teachers (above)? While this is not the focus of my inquiry, classroom observation data used in my research includes at least one example of a similar compromise.

West, Hailes and Sammons (1997) used a Smiley Scale to measure the attitudes of 6- to 7-year old children. The 290 pupils across 6 schools were taught how to use the Smiley Faces Scale, where they coloured in the expression that matched how they were feeling. They were given opportunities to practice so that the researchers could confirm the validity and reliability of their responses. Thirty-four children were also selected for individual interviews. This article reported mainly whether the children liked or did not like the selected activities, as well as other aspects of school. The most preferred curriculum activity was using the computer, followed by art and painting. The least preferred were science, practising handwriting and asking for help with spelling. Art and using the computer had the *least* number of children *not* liking them. In science it was the general aspects of science rather than the experiments that were not liked. Statistically significant gender differences were found in the following Chi-square tests: significantly more girls held positive attitudes towards specific activities. For example, girls enjoyed reading to self, reading to an adult, practising handwriting, working with shapes, and colouring or painting. Chi-square tests also showed girls significantly more positive about coming to school. Of the 34 children interviewed, 25 children were able to articulate reasons for their choice of Smiley face. Summarising their interview data, the researchers found that "for an activity to be liked .. interest, fun, ease and success were key factors" (p. 603). Conversely boredom, an activity being at an inappropriate level (too easy or too hard), and failure or fear of failure were important reasons. For example, one child explained about maths: "What I hate is ...like getting it wrong" (p. 605). This is yet another example of the "mistake stigma" (Herenkohl et al, 1999, p. 455). Interest versus boredom, level of difficulty and success versus failure were the main variables of enjoyment.

Affective experience during maths was the focus of a multi-method study by Prawat and Anderson (1994). The subjects were 32 x 4^{th} & 5^{th} graders comprising 13 girls and 19 boys with

ages ranging from 9 years 7 months to 11years 10 months in a combined class (almost identical age range as the children in this PhD research, also in combined classes). The children were videotaped for 20 minutes at a time, during maths "seat work" (p. 201). The children were also interviewed using video-cued recall techniques, and the transcribed interviews were coded for reported affect and reported antecedents. In addition, they used a range of measurement tools to sample children's perceived competence and intrinsic-extrinsic motivation. Summary data were used to address the "affective tone" for which they found that "students reported significantly more negative than positive feelings when engaged in maths seatwork" ((Prawat & Anderson, 1994)p. 209), and this was replicated at the individual level. All but five subjects reported more negative emotions than positive. The rate of negative emotions was higher for the 4th graders and greater for females as opposed to males. They cite the previous finding that girls are more influenced by negative information than boys, perhaps because boys get used to negative feedback and find it "less worrisome" (p. 210). Overall the ratio was more than two to one for negative over positive affect (p.211). Anger & happiness were the most frequent emotions, feeling dumb and bored also fairly common. Of the 105 reports of anger, over 3/4th occurred in the context of some task-related concern such as confusion or a problem with accuracy. When breaking these down at antecedent level, "most of this affect was achievement related" (p. 210). They found that even non task-related antecedents did relate to the tasks. They argue, "one could infer from these results that students were under considerable pressure to perform in the mathematics classrooms examined in this study. If so a number of factors may be contributing to this attitude. One is the performance or "right answer" mentality that is particularly pervasive in mathematics instruction and most students believe that problems in mathematics should be done quickly and without error" (p. 211). They also suggest that having been confined to their seats (desks) the children could only use the text book as their instructional tool, unless they used the teacher.

There was also a significant social dimension to the reported anger, with approximately one quarter of the events being due to something that was said or done by a peer (Prawat & Anderson, 1994). Students might indicate that their friends were bothering them – then go on to say that they had planned to get their work done. To investigate state versus trait aspects Prawat and Anderson (1994) grouped the rationales into four categories, three of which were task-related, and the fourth non-task related. These categories were tested against positive affect as the dependent variable, which they found was logical to do given its less occurrence. "In the context of so much negativity, apparently it is easier to determine what makes students feel good than it is to

determine what makes them feel bad" (p. 215). (This approach is far better than Rice's sadness induction reported earlier!) Their results confirmed that: "only the antecedent variables accounted for a significant amount of variance on predicting math affect. Individual differences accounted for little of the variance. None of the individual difference factors emerged as significant predictors in either of the two regression analyses... [supporting the contention that] interpretations of situations are proximate or the most immediate cause of affect in the classroom" (p.215).

The antecedents identified all reduced positive affect (Prawat & Anderson, 1994), most frequent being the perceived delays or disruptions to one's progress through the material, such as difficulties or needing help (Lazarus's core relational theme for anger again). For example, one child reported "total frustration" because he needed help but there was along line of people waiting to see the teacher. "Self-report, situational factors were more predictive of the quality of the youngsters' mathematics experience" (p. 217). The authors cite examples of opposite findings when conceptual and procedural knowledge was taught in tandem, with a classroom climate that encouraged freedom to explore ideas and to make mistakes. This contributed to more positive affect being reported.

Prawat & Anderson's (1994) study has particular relevance to my thesis, as the results are similar but more enhanced due to their focus on maths specifically. In referring to the children/students as youngsters, these researchers have acknowledged that the subjects are young. Much of the classroom research of children's experience labels the children as "students', putting them into a broad category spanning 12 years of school and beyond if we include adult education and life-long learning. While that may give the appearance of treating younger and older students as equal, it denies the different developmental needs. We have seen already that as children move through the grades in school they tend to experience less positive emotion in school, before that improves again in late teens (Csikszentmihalyi & Hunter, 2003). This indicates that the school context is less enjoyable in the middle school years, a time that coincides with significant developmental changes. Therefore treating this age group the same as older students may even exacerbate the potential for negative emotions. For example if Erickson's (1995) autonomy versus shame and doubt is in the ascendancy, being expected to act like a fully-grown adult without respect for the difficulties a child might be experiencing, may increase their emotional stress.

Moving schools was a context variable related to girls' reduced mathematics motivation, in a study of New Zealand intermediate school students (Townsend & Hicks, 1997). They found a decline in girls' motivation for mathematics during the transition from intermediate to secondary schools. These findings were also consistent with findings in the U.S.A. Townsend and Hicks (1997) suggest that the classroom context variables that influence student motivation, are more similar across local primary and intermediate classrooms, than across intermediate and secondary classrooms. Included in their analyses of variance of a range of self-report measures, social factors were also identified. Townsend and Hicks (1997) found that students reporting low satisfaction with their social relationships, had significantly lower levels of (task) value and higher perceived costs for maths and language tasks, compared with students who had high social satisfaction. Townsend and Hicks (1997) reported that girls of a similar age in the U.S.A. have been shown to be more vulnerable to classroom climate than boys. This was in terms of motivational constructs such as learning and performance and their perceptions of self-efficacy. While they acknowledge gender effects Townsend & Hicks (1997) do not include developmental variables in their discussion.

McCaslin, Tuck, Wiard, Brown, La Page & Pyle (1994) describe 4th graders as being at the threshold of the adolescent transition which is "typically defined as 10-14 years" (p. 469). Fourth graders are described as beginning to experience shifts in social cognition and interpersonal understanding of group norms, personal values, and friendships associated with pre-adolescence. This implies a developmental aspect within the "transactional relationship" (Nuthall, 1999, p. 143) between the external world of classroom participation and the internal world of cognitive processing, in classroom learning. Social development is "entwined" (Wentzel, 1996, p. 1) with academic development in the classroom context. Evidence in support of this might be found in the success of classroom interventions designed to create classrooms that address the social and emotional needs of elementary school-aged children. Such interventions have increased levels of academic as well as social competence in children (Wentzel, 1999).

More recently, Wentzel, Barry and Caldwell (2004) conducted a study on middle school friendships. 242 students were followed through from 6th to 8th grade (50% girls/boys). There were just two events sampled once in 6th grade and then again in 8th grade. Emotional distress was assessed in both grades with a range of inventories including depression and low well-being, an example of a probe being "I'm the kind of person who has a lot of fun" but reverse scored. Forms were administered during 45-minute class times, they were confidential but included the

names of the children in the classrooms so that the researchers could confirm whether children's nominated friends were actually reciprocated. One of the most relevant findings was that a friend's prosocial behaviour predicted an individual's prosocial behaviour. Analysis of variance was conducted to test for differences between groups of students with and without reciprocated friendships. Students without a reciprocated friend reported significantly higher levels of emotional distress in the 6th grade and in the 8th grade than did students with a friend (p. 198). However emotional distress and friendship status were not significant predictors of GPA. Also, GPA did not relate to individuals' efforts to learn. This might have some relevance in that although teachers might group students according to GPA this might have no significant impact on any of the students' achievement outcomes.

Gender differences were also found in Ainley, Hillman and Hidi's (2002) recent study of situated interest. Their subjects were 86 Australian senior high school (10th grade) students, 50% boys and girls, with an average mean age of 15 years 6 months. They were investigating the "immediate reactions" of students to text, this reaction being "an expectancy or anticipatory response" (p. 412) that represents their "triggered [or] topic" interest. Their definition of topic interest is "students' immediate reactions to text titles in terms of how interesting they expected them to be" (p. 412). They acknowledge that this immediate response might also be influenced by existing interest. This study is relevant to my thesis because they used on-line methods to obtain the students' immediate reactions. To do this they used Boekaerts on-line motivation questionnaire (OMQ) which measures affect and cognitions immediately before and immediately after learning and homework tasks.

Ainley et al (2002) adapted the OMQ by employing a computerized recording technique to monitor the students' responses at selected moments across four reading tasks. This would facilitate more accurate identification of specific antecedents and other process variables, such as affect or persistence with the task. For their affect probes they used Izard's theory as a basis including 11 emotions for students to select from. Students could select more than one if they wished.

Affect was measured through students selecting face icons on the computer, responses that the students practised in advance and which demonstrated good discrimination (Ainley et al, 2002). Three of the faces for "interested, neutral and bored" together accounted for between 84% (The Handmaid's tale) and 100% (the Blooding) of the first emotion choices at the end of Part 1 of the

texts. The reading tasks were taken from the relevant curriculum, and included two titles that might be expected to interest boys and two that might interest girls. A series of statistical analyses concluding with a principal components analysis resulted in three eigenvalues greater than 1, which were then subjected to varimax rotation. The three factors described broad categories of interest, which were then tested against gender, situational interest and topic interest. Their findings included a clear role for both individual and situational factors in topic interest, which in turn was associated with their gender.

Regression analyses to determine the direct and indirect effects of topic interest on responses and persistence during the reading of each text showed a strong association with gender (Ainley, Hillman, & Hidi, 2002). Girls reported higher topic interest and were likely to persist further with the texts than boys. Higher topic interest was more likely associated with feeling interested, while lower topic interest was more likely associated with feeling bored. Girls were more likely to persist with a text that rated as lower interest. Overall these findings are consistent with previous findings cited in that "the performance of boys and girls tends to be similar on high interest material, but when presented with lower interest material, boys do less well" (p. 425). This study is useful in demonstrating the value of on-line measures, the advances in design of such measures and the factor analytic approach successfully identifying more specific variables. It is interesting to see that senior students were prepared to respond to face icons in the measurement tool.

Ainley and Hidi (2002) have also reported their recently-developed various dynamic methods of computerising both the presentation of learning tasks and the recording of responses as students engage with short texts. Some of these require students to respond to prompts such as, "how interesting do you expect this topic to be?"(p. 55). One package uses face icons including a range of seven negative through to positive emotions in a children's social problem solving task. These probes can also be used to record students' individual paths through the computerised learning activity through time, providing an emotion timeline. However, they do acknowledge the situational limitations of computerised programme (Ainley & Hidi, 2002).

From the above research findings with more of a specific focus on gender, it appears that girls have more positive emotional experiences in school than boys. However, girls also experience more anxiety about maths, and they are much harder on themselves when they do not perform well. In general, girls approach rather than avoid, they persist through uninteresting tasks, and they cover up their disappointment. It seems also that girls have better relationships with their

teachers. Irrespective of gender, having reciprocated friendships reduces emotional distress. However, when working on maths, friends might be a nuisance and a source of negative emotions. Antecedents to negative emotions during maths related to specific situated events such as having to wait for the teacher or being interrupted in a task. Worrying about getting the right answer was also an antecedent. These specific findings have only been possible through multiple methods, including detailed questionnaires, interviews, observations, and video-recording of classroom behaviours. Analyses have included both qualitative and quantitative methods.

Collectively the literature presented in this section seems to have all the ingredients needed for detecting that elusive moment of learning and the associated emotion. Individually, the different research methodological combinations also demonstrate that creativity in using measurement tools is acceptable – which should be the case if this were truly a socio-constructivist approach. Based on the literature reviewed to date, a multi-modal methodology was deemed appropriate for my inquiry, together with an on-line measurement instrument that could be used with children aged between 9 and 11 years 6 months.

In the next section, I present the findings from two very recent experience sampling (ESM) studies. These two studies are presented together at this stage as they demonstrate the evolution of the ESM methodology both in terms of measurement instrument and data analysis.

Experience Sampling Method (ESM) – Recent Trends

Over recent years, the experience sampling method (ESM) has been used more frequently in the search for a deeper understanding of students' lives and their learning experiences. This literature review has already demonstrated this with the examples presented so far. In this section I report two very recent ESM studies.

Zelenski & Larsen, (2000) used ESM to investigate the distribution of basic emotions in everyday life, and conducted a series of correlations with their data, exploring emotion dimensions versus discrete models, and state versus trait. Their methodology will be discussed in detail, as it will be of relevance to the discussion of the statistical analyses conducted for this PhD which will be presented in a later chapter. Zelenski & Larsen's (2000) subjects were 82 undergraduate university students (22 men, 60 women) with a mean age of 20.46 years, recruited from a personality psychology class, and they did not know the specific research questions. They were

provided with enough daily report forms to complete three forms per day for a month, to be self-scheduled at approximately noon, early evening (6 pm) and late evening just before bed. The subjects had one practice completing the A4 double-sided single page form during their psychology class. The form requested a range of information including environmental variables, physical symptoms, activities, self-esteem and 15 specific emotion terms to represent the "generally agreed-upon" (p. 182) list of basic emotions. These emotions were *excited, interested, enthusiastic, happy, relaxed, quiet, bored, sad, guilty, lonely, frustrated, anxious, disgusted, angry* and *afraid.* The emotion question was "How much of each mood did you experience during the time period?" The students had a 7-point unipolar scale where 0 indicated "not at all" and 6 indicated "extremely much" (p. 183), to answer the question.

Zelenski and Larsen's (2000) results were first analysed for frequency (how often the emotion received a rating greater than zero), intensity (the mean rating level excluding zero) and dominance (the number of times that an emotion was rated higher than all the other emotions). Happiness and relaxation were the most frequent emotions being reported on approximately 88% of the occasions. The other positive emotions were approximately 65%, while the negative emotions ranged from approximately 45% for bored, frustrated and anxious to approximately 16% for afraid, angry and disgusted. Happiness was the highest rated for intensity. The negative emotions all rated at a similar average lower intensity, with frustrated and anxious slightly higher than the others. Only three emotions were rated significantly higher than all the other emotions on 51% of the total forms, indicating that 49% of the forms had their emotions rated similarly. The dominant emotions were happy (15.14% of the forms), relaxed (9.83%) and quiet (9.41%). There were no stand out or dominant negative emotions. When the negative emotions were collated, they were only dominant on 11.47% of the forms compared to 30.43% for the positive emotions collated.

Zelenski and Larsen (2000) then conducted *within-subjects correlations* to determine the extent to which two or more emotions co-occurred or blended during the same reporting occasion. To remove the between-subjects variance, emotion ratings were standardised by calculating Z-scores for each emotion rating for each participant, using only the other times that the individual participant rated the given emotion. The standardised emotion ratings were then correlated "across all reports and all subjects" (p. 188), resulting in 5642 correlations. The degree of co-occurrence or blending of any two emotions was indicated by the size of the correlation. For example, the correlation between interested and excited was .36, between happy and relaxed, it

was also .36, and for happy and interested it was .50. Significance levels were not provided, but these correlations demonstrate that happy and interested co-occurred more than interested and excited for example. In contrast, bored and interested correlated at -.17, indicating that these two emotions were "relatively independent" (p.190). However there were some blends of opposite valence emotions such as anxious and excited (r =.11), anxious and interested (r = .09). Anxious and happy were independent however (r = -.08).

Zelenski and Larsen (2000) then calculated *between-subjects correlations*. First they calculated each participant's mean on each of the emotions, averaged across the full reports for the month. These mean scores (a total of 82) were then correlated across the subjects. These correlations should demonstrate the individual differences between the subjects. They found that "in almost every case, the between-subjects correlations amongst like-valence emotions were much larger than the corresponding within-subjects correlations" (p. 190). For example, from their table of results, between-subjects correlations for the same examples above are interested and excited (r = .75), happy and relaxed (r = .39), happy and interested (r = .56), bored and interested (r = .11), anxious and excited (r =.40), anxious and interested (r =.30), and anxious and happy (.05). Separate average positive and negative interitem correlations for both the within-subjects and between-subjects correlations were then calculated using Fischer's r-to-z transformation, and then transformed back to r values. The within-subject interitem correlations were higher for positive emotions at r =.37, compared to r=.19 for negative emotions. The "corresponding between-subject interitem correlations were .57 and .58" (p. 192).

Zelenski and Larsen (2000) interpret the larger between-subjects correlations among like-valenced emotions as being consistent with a dimensional theory of emotion, because they indicate that emotion terms "can cohere into two dimensions" (p.192) perhaps representing a general positive or negative affect. The within-subjects correlations could be interpreted as conforming "more to a discrete emotion view" (p. 192) because of their lower r. "That is emotions were more interrelated according to valence when considered as person differences than when considered as state differences" (p. 192). The lower within-subjects correlations demonstrate the low co-occurrences of more than one emotion on any sampling event, reflecting the momentary or within-subject state emotions as to "how are you feeling now" (p.193). For example, citing the within-subjects correlation for sad and anxious (r =.19), Zelenski and Larsen (2000) describe it as "modest, suggesting that people are not usually sad and afraid at high levels

simultaneously" (p.193). They also argue that "it makes sense to think of variation in these discrete states as being due to situational influences" (p. 193), rather than due to personality.

Zeleanski and Larsen (2000) also suggest that a dimensional model of emotion might be useful when considering between-person differences, because the trait perspective lends itself to broader categories of like valence emotions. For example, "theories about why some people have this emotion a lot and others have that emotion will probably be most applicable to a few broad and valence-based dimensions of emotion" (p.194). However a dimensional perspective might become inconsistent with ambivalent or mixed emotions, and it may oversimplify the complexity of different positive emotion blends. For example their examples of happy being correlated with interested or with relaxed (above), differed in the strengths of their correlations, suggesting subtleties that would be lost through the broader dimensional interpretation. Schimmack (2003) argues that if pleasant affects and unpleasant affects are independent because variation in one affect can occur without reciprocal variation in the opposite affect, "then the distress of clients could be alleviated without producing positive affect and vice versa" (Schimmack, 2003, p. 99).

As far as which emotions are generally experienced in everyday life, Zelenski and Larsen's (2000) subjects "reported feeling positive emotions far more frequently and intensely than negative emotions" (p. 194). Citing Diener and Diener's (1996) previous finding that "most people are at least slightly happy" (p. 194), Zelenski and Larsen (2000) state that they can extend these findings by also saying "most of the time" (p. 194). They do acknowledge the limitations of relying on self-report at pre-programmed approximately 6-hourly intervals, without specific details of antecedents or physiology.

Zelenski and Larsen's (2000) timing might be a significant shortcoming. First, consider the fact that their subjects reported their states at the preset (interval contingent) times of noon, 6pm and bedtime. From the research findings on the ESM data of daily and weekly emotion or affect presented earlier, noon and 6pm are close to peak times for positive affect or happiness or excitement (Csikszentmihalyi & Hunter, 2003; Larson & Lampman-Petraitis, 1989). Reporting at these peak positive affect times might have been a variable in their subjects' retrospective perspectives of their moods for the previous few hours. If these students were already feeling better at those times of the day, their positive states may have enhanced their reports. Other positive influences might have been due to having an element of choice – within limits – as to whether and/or when they would actually complete the form, and the effects of actually writing

and reading their own reflection diary. On the other hand, the subjects were at the stage of their lifespans beyond the adolescent low of 16 years, and also beyond 18 years of age, when levels of happiness were found to move up again (Csikszentmihalyi & Hunter, 2003). Therefore their generalisation would be consistent in relation to age. Zelenski and Larsen (2000) themselves also question whether previous experimental research demonstrating significant effects of positive mood induction, might actually reflect the baseline positive mood of people anyway.

Zelenski and Larsen (2000) also acknowledge that the sample itself may be a limitation in that the distribution of emotion in the daily lives of different populations may be different. As a Psychology major myself, participating in this personality research process would have been a congruent and positive experience in my studies. In contrast, had our class been completing ESM data collection measures during the compulsory high-stakes Stage 2 Psychology Statistics class, the results would have demonstrated high stress. This would be related to our continuance in psychology being dependent on an "A" pass in this high-stakes class, while we were new to computer programme, which needed to be used in conjunction with learning the new statistics content. In addition, assignments had to be completed during the lab times.

This study is extremely relevant to my inquiry because it sampled a very similar range of emotions, and demonstrated yet a different way of statistically investigating the role of context on state emotions. This article only came to my attention after the data for my inquiry had been collected and prompted a range of statistical analyses with the present data which had not been considered until then.

Scollon, Diener, Oishi, and Biswas-Diener (2005) then modelled the methods of Zelenski and Larsen (2000) in their ESM cross-cultural investigation of pleasant and unpleasant affect, sampling the momentary moods of 386 university students across five different ethnic groups. Their 386 subjects consisted of 46 European American, 33 Asian American, 81 Hispanic (American), 94 Japanese and 61 Indian students, the latter two groups remaining in their own countries. Mean ages of each group ranged from 20.2 to 21.7 years. Over 11, 000 moments were recorded during the single ESM week, during which the students responded to five randomly timed signals each day. Except for the Indian students who completed their questionnaires on paper (pencil and paper format), the students were each given a hand-held computer that served as both the signal and the means to record their answers to the questions. Four positive emotions (joyful, happy, affectionate, proud) and four negative emotions (sad, worried, guilty, irritated)

were included for measure. The students recorded on a 7-point scale the degree to which they were feeling any of these emotions, 0 for "not at all" through to 6 for maximum intensity. Based on the methods of Zelenski and Larson (2000), data analysis consisted of both within-person and between-person correlations of the standardised means for each emotion for each person. The data for each ethnic group were kept separate for cross-cultural comparisons.

Similar to the findings of Zelenski and Larsen (2000), all like-valenced emotions were positively correlated, and opposite valenced emotions were negatively correlated across the whole sample (Scollon et al, 2005). These correlations were then submitted to a "maximum likelihood factor analysis with oblique rotation, constraining the model to two factors" (p. 35) of pleasant and unpleasant affect, done separately for each culture. Across the five cultures, the variance accounted for by the two-factor model ranged from 53.78% to 59.14%. The within-person factor loadings for each emotion were similar across the cultures. For example happiness ranged from .78 (Indian) to .86 (Hispanic). Worry ranged from .56 (Asian American) to .69 (Hispanic).

Next, Scollon et al (2005) created two single emotion values, collapsing the like valenced emotions by averaging the scores of each set to obtain a single value for both pleasant affect (PE) and unpleasant affect (UE). Within-person correlations between these two were significantly negative suggesting that "at the momentary level of emotional experience, PE and UE tend not to co-occur" (p. 38). Between-person analyses included both the frequency and intensity of the emotions. For the purposes of my inquiry, the frequency data is of most use. To compute frequencies Scollon et al (2005) summed the number of occasions that the emotion was reported, irrespective of their intensity rating. This meant that any score above 0 was simply tallied as one frequency. The mean intensity was then calculated separately. Correlations for frequency did not reach significance for any of the emotions for European Americans or the Hispanics, but for the Asian Americans, the Japanese and the Indian subjects there were several significant correlations.

Scollon et al (2005) thought that each group was too small to do between-persons correlations. But based on the similarities within the two apparent sets of correlations, each set was combined to form two comparison groups, namely one group that *did* have significant correlations and the other group that *did not*. They then "conducted two-factor analyses comparing Asians versus non-Asians by submitting the frequency scores for each of the four pleasant and unpleasant emotions to a maximum likelihood factor analysis with oblique rotations, constraining the model to two factors" (p. 43). The two factors accounted for more variance at the between-person level

compared the within-person level above. Findings included a cultural difference between Asian and non-Asian groups for frequency correlations of pleasant and unpleasant emotions. This correlation was .03 for non-Asians (non-significant) and .27 (p <.001) among Asians. This was similar for intensity as well. "Thus in Asian cultures, those individuals who more frequently (or more intensely) experience pleasant emotion also experience unpleasant emotion more frequently" (p. 44).

Scollon et al (2005) offer some interesting interpretations of these various results. For example, in their literature review, they had discussed how the two dimensional perspective of emotions is currently being also debated by Bagozzi, Wong and Yi (1999, in Scollon et al, 2005, p. 28) in relation to dialecticism. This debate addresses cultural differences in cognitive style and has recently been extended to include emotions. This debate argues a difference between Western and Eastern philosophies, where Western logic "tends to polarise contradictory perspectives...[and] Asian philosophies, such as Taoism, Buddhism, and Hinduism, emphasise tolerance for the paradox" (p. 28). When translating this to emotional experience, pleasant and unpleasant affect may be more likely to occur in the Asian sample compared to the non-Asian sample. At the between-person level, this cultural difference was significant (particularly for pride), and was also demonstrated between cultures even on the American university campus.

It is interesting to note that Brophy (1999) has also compared Eastern and Western psychology. For example, he argues that the more we learn about Eastern psychology the more we see that "certain notions that we have taken as universal are in fact specific to the context of western culture" (p. 39). For example, with motivation we assume that each individual is unique and that each person's development should take them towards "an increasingly differentiated and individuated self-concept" (p. 39). This individuation is not emphasised in Eastern culture. Brophy (1999) explains that Eastern People are socialised to think more in terms of membership in families or other groups more than their individual identities. Eastern psychology treats self-concept as both a delusion and impediment to contentment (Brophy, 1999). Brophy (1999) argues that we could benefit from more systematic comparisons of east and west. He also notes a similarity between Csikszentmihalyi's (1975) flow work of "in the moment" (p. 40) experience, and the Zen Buddhism approach to psychology (p. 40). It is beyond the scope of this work to discuss this in any detail. The main relevance to my research question is the implications of differing ways of coping with ambivalence, and their confirmation of the utility of the correlational analyses.

Methodologically Scollon et al (2005) have extended previous ESM research methods, through modelling and extending the methods of Zelenski and Larsen (2000). They argue that although the correlation coefficient test has its limitations as a test of independence, these limitations were not problematic for their study. What they wanted was to simply examine similarities and differences "in the relation between pleasant and unpleasant affect across samples, not to test for independence of polarity" (p. 49). They also used other computations. These issues are the most relevant to my inquiry. These and other studies presented in this literature review demonstrate the value in taking a creative approach to collecting and analysing the various ESM data. As has also been argued by these and other authors, traditional or expected methods have probably missed or minimised the complexities of emotion experience. Trial and error is fine, and each series of analyses takes and extends the earlier ones.

What is missing from both studies above, is the identification of specific contexts and environmental antecedents. For example, if details of the specific events or contexts were included in these analyses, as has been included in those of Yair (2000) and (Laukenmann et al., 2003), the state data would be enhanced. However, these two pieces of research presented in this section demonstrate the various ways ESM data might be analysed, and how each research question will determine the data to be sought through ESM. There is no "right or wrong" way of exploring and analysing such data. Scollon et al (2003) earlier argued that "ESM is most useful when applied in conjunction with other methods for instance traditional global reports" (p. 12), which would be in line with the call from many other psychology researchers for a multi-method approach. Scollon et al (2003) also acknowledge that ESM is not a panacea for all ills, but "when paired with other methods of assessment (ESM) remains a powerful tool that can aid researchers" (p. 27).

According to Schutz and DeCuir (2002) the dominant method of inquiry in psychology and educational psychology to date has been a variable-centred approach, from which a major outcome has been the state versus trait distinction. Although useful, this distinction might also be considered an "artefact" (p. 128), because it perpetuates the idea that emotion can be decontextualized as a "static variable ... or trait" (p. 128). In addition the measurement tool used in variable-focused research has a major impact on the results. We have seen examples of this in this literature review. As Scollon et al (2003) acknowledge, aggregation is one way to handle the massive amount of data that experience sampling or other in-depth qualitative studies generate, from which mean frequencies and so on can be calculated. But does the meaning of one's

construct change as variables are aggregated over time (Scollon et al, 2003)? Without the details of contexts as at the time of data collection, the specific relationship between emotion and the contextual variables will be lost.

Implications for Research – The Case for Multiple Methods

From the literature reviewed in this chapter, we can see the rich data yielded when both qualitative and quantitative methods are employed together. In the aftermath of the paradigm wars (Gage, 1989), there appears to be a consensus acknowledging the need for multiple methods. Quantitative and qualitative methods are complementary rather than conflicting. The increase in use of qualitative methods within the socio-constructivist framework is important because qualitative methods help us understand the "black box" (Turner & Meyer, 2000, p.71) that the classroom has become. In their recent review on emotion inquiry, Schutz and DeCuir (2002) also addressed the need for multiple methods in the education context:

> In addition to the need for multiple perspectives, the need to utilize multiple methods in the study of emotion in education also seems clear.,....However researchers must be aware that multiple methods produce the potential for divergent as well as convergent findings and it is this diversity of findings that is also useful to our understanding of emotions in education (Schutz & DeCuir, 2002, p. 131).

Shutz and DeCuir (2002) also acknowledge that the current interest in Vygotsky's (1981) socio-cultural approach to inquiry has prompted an interest in investigating emotion from a socio-historical contextual approach. "Understanding the social-historical nature of emotions and the transactions among cognition, motivation and emotion" (p. 130) will be an important part of any inquiry. Therefore, not only should we be investigating emotion constructs but also the social-historical contexts from which those constructs emerge (Schutz & DeCuir, 2002). Social-historical contexts will include the many variables argued in this chapter as relevant to understanding the role of emotion in children's learning task engagement. They cite as an example that a student experiencing the emotion of enjoyment during any school activity is part of a class, a school, a family, a community along with the events which brought her or him to this moment. In addition, emotions should be studied in the context of classrooms and schools, taking the student's personal historical and social-cultural influences into consideration. The emotions involved in teacher-student and peer transactions at the interpersonal level and the impact of high stakes testing on students are also important areas.

Snow, Corno & Jackson (1996) agree that educational contexts provide a particularly important collection of situations within which persons interact as they develop. This means that constructs linked to these contexts and their development within them should be uniquely important for educational psychology. Based on their extensive review of the literature on individual differences in affective and conative functions, Snow Corno and Jackson (1996) contrast two strategies for future research. One would start from psychological constructs and look for evidence of relation to and specialisation in particular educational settings. The other would begin from educational settings, deriving specialised constructs that work within them, and then look for correlations within general psychology. "What is salient and therefore useful, might best be co-constructed by scientist and practitioner working together in local contexts" (Snow, Corno & Jackson, 1996, p. 297). Their view is that this might help merge theory and practice, to produce both understanding of individual differences in education and improved ways of using them. Shuell (1996) agrees that educational psychology needs "studies that investigate the relationship among cognitive, affective, social and motivational aspects of learning from instruction" (p. 760). Such a rationale would be consistent with the aims of The Project on Learning (Nuthall, 2002).

As argued by Hogan et al (2000) the multi-method approach is pragmatic. When the ultimate goal is to generate knowledge that can lead to improvements in classroom practice, "our use of theoretical tools reflects the needs encountered in that practical endeavour. Eventually cohesive education theories can arise from such eclectic beginnings" (pp. 380-381). Incorporating a research approach based on Lazarus's (1991) cognitive-motivational-relational theory of emotion located within the constructivist classroom context, is a good example of an eclectic approach. Eventually my inquiry is trying to find out the role of mood or emotion in children's learning task engagement in the elementary school classroom. From the wealth of literature reviewed here only a few researchers have been able to offer specific findings and effects. So far we have seen that emotion is significant, but we have also seen how difficult it is to specifically identify its role without having access to the environmental variables at the time of specific emotional experiences. However, each of these pieces of research is valuable in sign-posting where to research next. The most elusive variables appear to be those learning moments, and this is understandable as these occur within the individual learner. Therefore emotion research needs to also pay attention to those momentary events, yet not become "bogged down" in them.

"Context is a key to understanding the complexity of classroom practice" (Alton-Lee, 2003, p. 9). Therefore New Zealand research needs to explain and inform the New Zealand context. According to Alton-Lee (2003) there are currently very few reviews of New Zealand research on learning and teaching. Because of the importance of context we need to be able to locate the best evidence of practice that is most readily relevant and applicable for the diverse students in NZ schooling. Therefore my thesis will contribute findings on children's emotions in elementary school classrooms that are situated in New Zealand, rather than in U.S.A or Britain. Not that this is intended as cultural comparative study, but the findings might be of particular interest to New Zealand teachers, educational psychologists and importantly to the children themselves.

Throughout this literature review, the subjects have been referred to as students, learners or children, depending on the terminology of the authors. Earlier during the theoretical perspective discussions, the subjects were referred to as children. The words used perhaps have more implications than we realise. Because elementary school students are children, perhaps we should be using child-centred approaches, which means that we should be approaching any inquiry from the child's perspective (McCombs, 1993). This should then enable the instruction implications to emerge from "understanding of how children perceive and construct the world on their terms" (p. 290). McCombs (1993) also argues that in this postpositivist era, by not separating what is known from the knower, we cannot then take the person – or in the present case - the child - with his or her values, interests, needs and consciousness, out of the act of knowing (McCombs, 1993).

Ballard (2004) challenges the terminology used about children in learning contexts. Ballard describes it as "a very serious matter when we stop talking about children in our classrooms and our schools (p. 20). For example Ballard (2004) suggests that labelling children as "learners" (p. 20) should be resisted as it creates a "utilitarian" (p. 20) perspective, by focusing on what the child *does* in school, rather than focusing on who the child is. However, the learner-centred perspective might actually be a more useful perspective compared to earlier perspectives that had lost sight of the need for learning to occur in the student or learner. The increase in teachers focusing on learning has meant that the concept of learning has now become more salient. I do agree with Ballard (2004) to the extent that acknowledging that our learners or students are children reminds us of the need to acknowledge children's developmental stages and needs.

Ballard (2004) further argues that the label of learner separates the teacher from emotions and sees teaching itself as "product oriented" (p. 22). The product-oriented perspective differs from that of Sutton and Conway (2001) and Hargreaves (1998) cited earlier, who acknowledged the emotion effects from the teachers' perspectives yet still referred to their learners as students. Ballard (2004) argues that if we use the term "children" we gain back the perspective of a relationship between the teacher and the child, with the further implication of "caring for and about children ...[including] caring about their learning" (p. 22). This requires a greater professional commitment than merely caring about learning outcomes (Ballard, 2004). This is consistent with my own perspective that we need to reduce the potential for depersonalising our children in schools by labelling them generically as students or learners, if we wish to understand their emotions. This in turn should enhance emotional intersubjectivity (Denzin, 1984) and facilitate the appropriate scaffolding for their learning (Smith, 1998).

The arguments for considering children as children and not students might appear at odds with the selection of literature reviewed for my inquiry. This literature review has included findings across the full age spectrum of students. For example, I have included pre-school through to university students. This selection reflects the populations sampled and reported in relation to children, emotion, mood, learning, task engagement, gender and achievement, as well as specific emotions identified, and many variations on the theme – to borrow the term from classical music. I used PsycINFO (formerly PsycLit), and ERIC as my primary sources for the literature searches, which I frequently updated throughout.

The literature sample also likely reflects the difficulties inherent in sampling children in their school contexts. However, this literature review also demonstrates the evolutionary process that is occurring across the psychology and education domains. For example, Pekrun (1992, 1995) and Boekaerts (1993) have both identified the salience of emotions in school contexts and they have continued in this work. They have also both designed on-line measures or interview methods intended to elicit emotion data. As shown earlier in this review, Boekaerts (2002) and others have tried out different types of questionnaires, and the ESM researchers have also done the same. Their methodological findings as to shortcomings and so on have been extremely useful in my considerations of how to approach this younger sample. Further, the findings of McPhail et al (2000), Oldfather (2002) and others demonstrating the value of spending time with subjects in their contexts to capture as many relevant environmental variables (Lazarus, 1991) as possible,

confirm that this is not a speedy process. This in turn will be reflected in the rate at which findings on children's experiences of school can be published.

Finally on the point of children versus students versus learners, if the constructivist classroom perceives children as being co-constructors of their own knowledge, why is there such a prevalence of negative emotions in this age group? It might also be useful to remind ourselves that the unique and wondrous period of life known as childhood has only been discovered in the last 150 years (Santrock, 1997), prior to which the importance of children's cognitive, motivational and emotional development was not understood. As educators, we need to remember this and not use terminology that implies that our five-year olds and our 20-year olds are the same.

Summary and Implications for Inquiry

This literature review began with a selection of relevant emotional developmental findings confirming that it would be possible and feasible to consider talking about children's emotions with the children themselves. The findings on learning task engagement were then presented through the perspective of the three functions of the mind (Snow, Corno & Jackson, 1996). The timing of my inquiry was argued as being appropriate and consistent with the many calls for students to be consulted and heard in relation to learning tasks, which are still regarded as important vehicles for delivery and internalisation of curriculum. The wide range of classroom context literature spanning pre-school through to university contexts and including any that attempted to study emotion in classroom contexts was then presented and discussed in relation to my inquiry and the present sample. From the classroom context literature, various findings in relation to antecedents, learning, achievement, and gender differences were reported. Detailed attention was given to the more recent ESM studies that appeared to offer new ideas on how to analyse the wealth of data obtained by ESM methods.

Fortuitously, prominent researchers such as Meyer and Turner (2002) and Linnenbrink and Pintrich (2002), have more recently argued for attention to emotion very similarly to my own arguments put forward in my research proposal for my inquiry. This literature review has concluded with the arguments in support of a multi-modal methodology. These arguments were fully congruent with and well supported by the literature presented and discussed in this review.

Finally, not only have researchers in education found that it is now time for multi-modal methods to be applied to researching emotion in the classroom, but also researchers in the emotion domain itself have argued the same.

> In no aspect of the human condition other than that of emotional life is it more obvious, that those who investigate should be comfortable with a multidisciplinary approach and with a theoretical pluralism. Anything else would not do sufficient justice to the complexities of a fascinating area (Strongman, 2003, p.298)

CHAPTER FOUR: METHODOLOGY

The literature review has demonstrated the increasing trend towards multiple methods or multi-modal methodologies in the research of children's and older students' emotions in the education context. These might include various qualitative methods, or a combination of different qualitative and quantitative methods. The purpose of this chapter is to explain the multi-modal methodology used in my inquiry to investigate the role of emotion in children's learning task engagement in the elementary school classroom.

First, the relevance and appropriateness of qualitative and quantitative methods will be briefly explained. Next, the procedures for the selection of schools and target children, the observation, video recording and interviewing methods for the Project on Learning (Nuthall, 2002) will be summarised. This is important information as it provides the context for my research. For example, the existing project was already underway at the time of my research proposal to investigate the role of emotion, which means that the research design of the project itself was not structured specifically for my research question. However, Nuthall (1999) had designed this project to allow more exploration of the "motivational and attitudinal aspects of children's experiences" (p. 249), which is why it was the appropriate context for my research question into children's emotions in the classroom. My inquiry has contributed further to the overall methodology of the Project on Learning through specific video-cued interview procedures and a modified experience sampling methodology (ESM) (Csikszentmihalyi, 1975).

I shall conclude this chapter by arguing that the depth and quality of data collected enable a wide range of analyses towards identifying how emotion might be involved in children's learning task engagement. This project has also afforded a unique opportunity to study these children in the naturalistic setting of their classroom contexts. As Nuthall (2002) has explained, "every commentator on our research has noted the extremely rich nature of the data and the unique insight it provides" (p. 10).

Qualitative research is inductive (Davidson & Tolich, 1999, p 19), recognises the importance of subjective experience and the reality of people's lives (Burns, 2000), and is "a field of inquiry in its own right" (Denzin & Lincoln, 2000, p. 2). Qualitative research crosses disciplines and paradigms, and uses various empirical methods ranging from case studies and reports from subjects' personal experiences to observation and interview, which - taken together - provide a

triangulation of the evidence in an attempt to understand the "phenomenon in question" (Denzin & Lincoln, 2000, p.5). Such triangulation of various multiple sources of data acknowledges that there is more than "one objective reality out there" (Smith 1998, p. 44). This approach is also consistent with the socio-constructivist perspective. Triangulation also validates the data, adding rigor and depth to any inquiry (Denzin & Lincoln, 2000). Qualitative researchers are very interested in understanding human behaviour from the subject's perspective, which Smith (1998) regards as necessary in educational contexts "because education lacks the extensive cumulative descriptive data present in the other sciences" (p. 44).

Quantitative research measures or counts numbers, is "usually deductive" (Davidson & Tolich, 1999, p. 19), and implies that social data can be quantified (Burns, 2000). Quantitative methods might be seen as psychology's attempt to be a separate domain from philosophy, by using the apparent objectivity of numerical data and data analysis (Behrens & Smith, 1996). Nuthall (1999) was not convinced of the usefulness of quantitative methods and argued that:

> A great deal of what has been possible in the analyses reported in this monograph, would not have been possible with methods that aggregate data across concepts (as in total scores in achievement tests) and across individual students (as in average scores for groups of students). There is not reason to believe that aggregation of data across time would be any less misleading (Nuthall, 1999, p. 249).

As I shall explain shortly, in order to obtain data on the children's emotions a modified experience sampling technique (ESM) (Csikszentmihalyi, 1975) was used, resulting in a range of immediate quantitative possibilities. For example, the first instinct was to tally the frequencies of specific emotions. The late Professor Emeritus Nuthall was interested in these initial frequencies and other early quantitative analyses of these data. I will never know how he might have responded to the latter aggregated methods that I eventually chose to also explore, but because they were not intended to replace the qualitative analyses, I would hope that he might have been interested in these results as a further triangulation process.

Behrens and Smith (1996) argue that both qualitative and quantitative research have common goals and characteristics. Both methods acknowledge that "analysis is a construction of the researcher" (p. 948), in that the researcher brings her own perceptions and history to the research process. They are both interpretive. For example any quantitative or numerical categories chosen may *appear* objective, but they reflect the cognitive processes of the researcher. Words and

numbers are merely symbols and while the term "data" (p. 949) implies objectivity, it refers to both the observed phenomena and their recorded or re-coded "representation(s)" (p. 949). This includes tallies of frequencies, observation notes and interview transcripts. Generally, data analysis is undertaken on data that has already been categorised according to the analyst's interpretation. Other characteristics common to both qualitative and quantitative methods include the social relationship between the researcher and her subjects (or participants) and that both methods "aim to reduce large amounts of data to a summary that is comprehensible to the human mind without sacrificing meaning" (p. 949).

A qualitative approach in the naturalistic setting of the school classroom is consistent with Lazarus's (1991) belief that experimental studies are not the most appropriate ways to study human emotions. He argues that even in the laboratory situation, reliability is a problem because there is still some sort of social interaction required in order to generate a specific emotion, which immediately undermines the assumed control associated with experimental studies. Lazarus's (1991) cognitive-motivational-relational theory "presents a road map of the emotion process in terms of a finite number of person-environment relationships" (p. 437), which then allows more scope for research both developmentally and over the life span. This means that both the context and the individual subject's emotional processes within that specific context need to be included in the research design. Therefore in order to study children's academic emotions in the classroom context, the research must take place in the school classroom context.

The Research Context

My research was conducted within the Project on Learning (Nuthall, 1999), which was a three-year research project (1999 – 2001) on how students learn from their classroom experiences. The Project's methodology was based on the "Understanding Learning and Teaching Project", an earlier series of studies previously conducted by Adrienne Alton-Lee and the late Professor Emeritus Graham Nuthall of the University of Canterbury (for example - Nuthall, 1999; Alton-Lee, Nuthall & Patrick, 1993; Nuthall and Alton-Lee, 1994, 1993). This unique and comprehensive research methodology has been described as "a model for the next generation of research on classroom teaching and learning" (Shuell, 1996, p. 756). Both qualitative and quantitative data have been used in these studies to demonstrate the dynamic nature of individual children's learning processes in the classroom context.

The analyses of the eight earlier classroom studies (Studies 1 – 8) focused mainly on the informational content of students' experiences (Nuthall, 1999). Arising from the many findings - including the required four interactions for learning, and the role of self-initiated interactions with materials or peers in learning (Alton-Lee, Nuthall & Patrick, 1993; Nuthall & Alton-Lee, 1994), were questions as to the processes by which these occurred. According to Nuthall (1999):

> Before any analysis of the ways in which students learn how to learn is complete, it must incorporate a parallel analysis of the ways in which children acquire interests and attitudes (Nuthall, 1999, p. 249).

Therefore one of the purposes of the current three-year project was to develop and incorporate new research techniques in order to account for motivation, attitude and other relevant variables. Within the context of the current three-year project, the purpose of my research question was to investigate the role of mood or emotion in children's learning task engagement.

Summary of Procedures

The following sections provide a summary of the research procedures in order to provide the general context of my research. Components relevant to my research specifically, will be explained in more detail as appropriate. The following general setting up procedures were carried out under the direction and supervision of the Principal Investigator- the late Professor Emeritus Graham Nuthall.

Selection of Schools

Letters of invitation were sent to a random sample of schools with decile ratings between three and ten in a large section of a New Zealand metropolitan city. Decile ratings categorise New Zealand schools according to the extent to which they draw their children from low socio-economic communities. For example, a Decile 1 school indicates the 10% of schools nationally with the highest proportion of children from low socio-economic groups, compared to Decile 10 schools which comprise the 10% of schools nationally with the lowest proportion of these children. The data for these calculations are drawn from national census and school enrolment information. Prior to 2005 these ratings also included ethnicity – the percentage of Maori and Pacific and refugee children. For the Project on Learning, schools across the lower to upper Decile ratings were given the opportunity to participate. The letters sent to these schools

explained the project and invited principals for expressions of interest in participating in the studies.

The Principal Investigator then met with the principals who had replied and indicated that they wished to participate, and their Year 5/Year 6 teachers. The teachers needed to be experienced classroom teachers, who would be comfortable with the video/audio recording equipment operating continuously, as well as the presence of up to four observers throughout the full duration of a unit of learning. The duration of these recordings and observations might take up to four hours per day for an average of six to ten days.

Eventually, four schools with Decile ratings between six and ten were selected in each of which two classroom studies were conducted. Table 4.1 presents the three schools in which my research was undertaken.

Table 4.1

Characteristics of the Schools Selected for the Project on Learning

Study Name	School Decile	School Roll
Study 13. Egypt	6	450
Study 14. Migration to New Zealand	6	450
Study 15. Construction	8	137
Study 16. Kitchen Chemistry	10	229
Study 17. Space	8	137
Study 18. The Aztecs	10	229

My research was undertaken in three schools within Classroom Studies 13 to 18 (Table 4.1). Studies 13 and 14 were conducted in two different classrooms in the same Decile 6 school. Studies 15 and 17 were conducted in the same classroom of a Decile 8 school, while Studies 16 and 18 were conducted in the same classroom of a Decile 10 school (Table 4.1). For the purposes of reporting my findings within the context of the Project on Learning, the classroom studies will be referred to by their numerical names. Due to the many studies overseen by the late Professor Emeritus Graham Nuthall, this will ensure accuracy and continuity of my ongoing and future reports or publications.

Having selected the schools, the Principal Investigator met with each classroom teacher for preliminary discussions as to selecting a suitable unit in science, social studies or mathematics

which would take about six to ten days. During these discussions the teacher's learning outcomes, teaching strategies and specific resources were identified.

Selection of Subjects (Target Children)

For each classroom study, the Principal Investigator used a stratified random sampling procedure to select four target children in each classroom to represent gender, achievement (anecdotally referred to as "ability") and ethnic background. Children with significant behaviour problems, learning disabilities, or experiencing significant stress were not included. Neither the teacher nor the children were aware of the identities of the target children until after the studies when the target children were interviewed.

The teacher provided student achievement data for the whole class, which consisted of each child's Progressive Achievement Test (PAT, Reid & Elley, 1991) scores for Reading, Reading Comprehension, Listening Comprehension, Reading Vocabulary and Mathematics. They also provided Equivalent Age Levels (PAT) for Reading.

Progressive Achievement Tests (PAT)'s (Reid & Elley, 1991) are nationally standardised tests used by teachers in New Zealand schools, for various forms of tracking and grouping children within and between classes (Nuthall, 1999). The PAT Reading Comprehension Test (Reid & Elley, 1991) has a relatively high correlation with teachers' ratings of scholastic ability ($r = 0.78 - 0.88$, Reid, Jackson, Gilmore & Croft, 1981), and with the test of scholastic ability ($r = 0.70 - 0.77$, Reid et al, 1981). It also has a high loading on a general academic ability factor (Hattie, 1979), similar to nationally-standardised tests in the U.S. and Britain (Nuthall, 1999).

The PAT authors recommend strongly that no student should be labelled "formally or informally" (Reid & Elley, 1991, p. 28) solely on the basis of PAT scores. For example, there is a risk of teacher error/s in a range of aspects from marking the scripts to interpreting the scores, which reduces the degree of measurement consistency. However, because New Zealand teachers use PAT tests in conjunction with their current experience and knowledge of their students' achievement, these PAT scores were regarded as an appropriate measure for selecting the subjects (target children) for the Project on Learning. This was a pragmatic decision based on the ways that PAT scores are used, as opposed to reflecting the philosophy of the Project on Learning or this present research.

Stratified Random Sampling Procedure

The PAT scores for reading comprehension, listening comprehension, reading vocabulary and maths were averaged, to obtain a mean PAT score for each member of the class. With the exception of reading comprehension scores, where there was a major disparity such as a very high or very low score, this was not included. In every case, reading comprehension was included because of its high correlation with academic ability.

The students were arranged by PAT average scores and grouped according to gender and year level. These two groups were then sorted into two sets of children with PAT scores above and below the median for each group. These became the categories from which up to six children (also representative of Maori, Pakeha and other ethnic groups in their class) were randomly selected. From these six - where possible – children with the highest and lowest PAT scores were eliminated. This selection procedure resulted in four target children comprising one higher achieving boy and girl and one lower achieving boy and girl for each study. In Studies 15 – 18, this stratified random sampling occurred twice for each classroom so that there were two different sets of four target children per individual study. The characteristics of the four specific target children for each of the six classroom studies are reported in Table 4.2.

Table 4.2

Characteristics of the Units and the Individual Target Children Selected, Observed and Interviewed

Topic of unit	Target Children (gender)	Age (years)	PAT Equivalent Age Level for Reading	Class Level
Study 13. Egypt	Bart (m)	9.06	9 – 10	5
	Justin (m)	10.02	11 – 12	5
	Nellie (f)	9.11	10.5 – 11	5
	Edith (f)	9.10	9 – 10	5
Study 14. Migration to New Zealand	Todd (m)	10.02	11 – 12	6
	Tyler (m)	10.10	12 – 13	6
	Cathy (f)	10.11	11 – 12	6
	Harriet (f)	10.06	8 – 9.5	6
Study 15. Construction	Kellie (f)	9.80	12 – 13	5
	Kitty (f)	10.02	10 – 11	6
	Mike (m)	11.00	10 – 11	6
	Rhys (m)	10.01	8.5 – 9	5
Study 16. Kitchen Chemistry	Beth (f)	9.06	9 – 10	5
	Elle (f)	9.09	11 – 12	5
	Jeff (m)	9.05	12 – 13	5
	Jack (m)	9.08	8.5 – 9	5
Study 17. Space	Dion (m)	9.06	9 – 10	5
	Joseph (m)	11.00	12 – 13	6
	Lois (f)	10.10	12 – 13	6
	Abby (f)	10.03	9 – 10	6
Study 18. The Aztecs	Ned (m)	10.05	10.5 – 11	6
	Rod (m)	9.04	13 – 15	5
	Rewa (f)	9.07	10 – 11	5
	Libby (f)	9.04	10 – 11	5

Study 13 was conducted in a classroom comprising children at Year/Level 5, while Study 14 was conducted in a Level 6 classroom (Table 4.2). Studies 15, 16, 17 and 18 were conducted in two mixed level classrooms. Harriet, Rhys, Jack and Abby were the only four target children overall whose PAT Equivalent Age Levels for Reading were lower than their chronological ages, although not by very much.

I have included these data on the twenty-four target children from Studies 13 to 18, because I use the video-cued interview data from all of these children in Chapter Ten. These target children form the "wider sample" referred to on Page 379, and they have also contrbuted to the evolution of my video-cued interviewing methods described in the methodology. In Chapters Five and Six, I report data from the classrooms of Studies 17 and 18. In Chapters Seven, Eight and Nine, I focus solely on Study 17.

Familiarisation and Training

At least one week prior to the unit, six miniature video cameras were set up around the ceiling of the classroom. Four of these cameras were directed on the individual target children and also captured visual data of the children on either side. Two wide-angle lens cameras covered the whole classroom from opposite corners of the room. Each camera was linked to a video recorder and time-code generator. During the preceding week, the trained observers (including myself) spent time in the classroom observing the class and trialling the equipment. This enabled the teachers and children to become familiar with the equipment (including individual student broadcast microphones) and the observers. The observers also became familiar with the children in the class and the classroom context.

Test Development and Administration

A printed test was developed to assess all intended learning outcomes and other material which children might learn from the resources (for example books, web-sites, videos). Questions about the anticipated levels of difficulty or interest were also included. Test items were generally multiple -choice and short answer. This test was used as both a pre-test and post-test. The test was presented as a pen and paper method. The Principal Investigator also read the test questions out and each child wrote their answers on their individual scripts.

Recording and Observing During the Unit

During the unit, the observers (including myself) kept continuous written running records of the behaviours of the target children. All the children in the class wore individual broadcast microphones, of which only those worn by the four target children and the teacher were "live". Continuous audio- and video-recordings were made of each target child's behaviours and speech,

and everything they heard. The sensitivity of the individual broadcast microphones was such that the utterances of other children' in close proximity were also audible, thus enabling full conversations between the target children and other children or the teacher to be recorded. Photographs and photocopies were made of everything that the target children read, looked at, wrote, illustrated, or made.

Recording Homework

Each day the whole class filled in a diary describing anything they had done that related to the topic during out-of-school hours.

Immediate Post-Test

Approximately two weeks after the unit was completed the post-test was administered on paper and orally to the whole class by the Principal Investigator. Post-test items relating to predictions such as the level of interest and difficulty were re-worded appropriately.

Content Interviewing

Following the post-test, the late Professor Nuthall and the other doctoral student on the Project on Learning (Sue Collins) interviewed the target children about their knowledge of the content of the unit. The target children were given a clean copy of the post-test and invited to give verbal answers to each item. For each answer given the target children were asked why they had given that answer, where they thought they had learned that answer, did they remember this information coming up during the unit, had they known that information prior to the unit, and so on. They were asked about their experiences of the unit as a whole, what they had liked and disliked, and what they had found easy or difficult to understand.

Teacher Interviews

Sue Collins interviewed the teachers from Studies 11 to 18 about their aims and rationales for their teaching strategies employed during the studies, and their retrospective views as to whether they had achieved what they had intended. I also interviewed the teachers from Studies 14, 15/17 and 16/18 about their views of the relevance of children's emotions.

Transcribing and Collating Data

The recordings made during each study were transcribed and copied onto data files by trained personnel. These were supplemented with observers' notes and copies of everything the target children were seeing, reading, writing, or illustrating over the duration of each session. The transcripts were organised into 15-second intervals, which were numbered consecutively. For example, a single 75-minute session resulted in 300 x 15-second intervals, through which the full experience of each of the four target children was presented throughout the full duration of the session. Classroom transcripts will be explained in more detail shortly.

Coding

The full classroom transcripts were coded for both content and behaviour. Content codes focused on the relationship between the information contained in each relevant experience and the information the target children would need to answer the relevant test item/s correctly or completely. Behaviour codes focused on the level of target child's task engagement, the types of interaction with peers (for example content-related or social), and the teacher. Coding also included the context for example whole class, group or individual. Coding will be explained in more detail shortly.

Analysis

Analysis of the coded data contributed to both qualitative and quantitative analyses of specific classroom events. The various analyses will be explained in more detail in subsequent sections of this chapter.

Ethical Considerations

In his proposal to the Marsden Fund, Nuthall (1999) explained:

> The ethical problems in this kind of research are considerable. Our experience from previous studies indicates that we must spend considerable time building up a relationship of trust with the school Boards of Trustees, principals, teachers, children, and parents of students. The nature of the research and its purpose needs to be transparent to all participants. (p. 10).

Following the preliminary selection process, informed consent for each study was obtained through the following systematic process.

Informed Consent from Parents and School Community

Once the topic had been negotiated, a booklet explaining the project was distributed to the school principal and offered to the Board of Trustees. After obtaining permission from the school, based on the planned unit of study, a letter was sent with a parents' booklet to the parents of each child in the class, asking permission for their child to be included in the study. Included in the informative booklets, was the undertaking to share with the schools and parents as much of what we learn as we can.

Parental permission was usually unanimous. Occasionally parents made direct contact with the Principal Investigator at the university for clarification. For example one child's parents negotiated conditional approval due to their religious beliefs about video technology. Another child's parents rang the Principal Investigator after the study had been completed to ask about findings.

Informed Consent from the Children

The Principal Investigator discussed the project with the class, including negotiation of the privacy conditions in relation to wearing the microphones, which would record their every utterance. Obtaining informed consent from children who are in a compulsory attendance context can be "problematic" (Snook, 1999, p. 75). Therefore to protect their personal privacy, the children were offered the right to turn their microphone off if they were saying something they did not want to be recorded. Children occasionally exercised this right, for example when they were wishing to tell each other secrets that they did not wish the researchers to hear. This has been cited as "a good example of ethical practice" (p. 75).

Confidentiality and Anonymity

As part of the informed consent process, the schools, the teachers and the target children have been guaranteed privacy. All names and identifying details have been code-named in any verbal, written or published reports. All observation sheets were code-named prior to each observation

session. While the cameras and VCR equipment remained in place throughout the study, all materials including code-named videotapes, observation sheets and other notes were removed at the end of each observation session. They were then stored in locked premises in the research office at the university. The Project on Learning research team members are the only persons authorised to access this data. All recorded data will be destroyed when they are no longer needed by the Project on Learning team.

Cultural Sensitivity

The researchers respected the Treaty of Waitangi by ensuring that Maori children were represented in the samples. Other different ethnic groups were also represented as appropriate.

Summary of Ethical Issues

In summary, the Project on Learning has placed a high priority on addressing the wide range of ethical issues, associated with this intensive research methodology. This approach was praised by Snook (1999) in his statement, "If only all researchers were as sensitive to the rights of young children" (p. 75).

Classroom Observations

The main purpose of the observations and video/audio-recording was to obtain accurate, detailed descriptions of target children' behaviours, particularly in relation to their learning of new concepts. During the classroom observations the target children's behaviours were coded as the observations were recorded. This enabled the observers to obtain complete, accurate and comprehensive records of behaviours and events for each 15-second interval. (This also helped the transcribers, as my writing is somewhat difficult to read.) A comprehensive set of codes was used to record the observed behaviours. Some examples are listed below:

- RBK reads book
- ROW reads own work
- Wr O W writes own work
- WT watching the teacher
- WWB watching the white board

- TS talk to self

The coded observations were recorded on to pre-prepared, code-named observation sheets, which were set out in 15-second intervals. The observers used individual stopwatches, all of which were synchronised with the time coders on the VCR's, prior to commencement of the session. This preparation left the observers free to concentrate on observing and recording as many of the target children's behaviours as possible, as well as making notes about the context. The observation data and all recorded data including copies of what was read or written (as per behavioural codes) were then brought back to the university for transcribing.

Classroom Transcripts

The full transcripts of observed and recorded data were presented in 15-second intervals for each classroom study. As an example, Figure 4.1 provides an excerpt of the transcripts of two 15-second intervals in sequence from Study 16, Day 6. Each 15-second interval transcribed contains the following information, which is listed and explained in relation to Figure 4.2:

- The name of the study, for example Study 16
- The specific day, for example Day 6
- The context, for example whole class or group or individual
- The time, which in this case is 2.03.15pm.
- The 15-second interval numbered in sequence. For example, Time 32 (Figure 4.1) indicates that this is the 32nd 15-second interval in the full transcript. This facilitates identification of the time frame. In conjunction with the numbered time sequence, this confirms that this session started 8 minutes ago at 1.55.15pm.
- The recorded dialogues from the teacher's and four target children' microphones.
- The abbreviations of specific behaviours of the individual target children, as transferred from the observation sheets.

Study 16, Day 6	Whole Class	Time 2.03.15	No. 32
Pupil: Sodium ..... Teacher: Lorraine? Lorraine: Um sodium **bi**carbonate *(T writes sodium bicarbonate on the whiteboard)* Teacher: That's right. Just seeing if you can remember. All right. Two tablespoons of baking soda or sodium bicarbonate and six raisins.			
Beth WT WWB	**Jeff** WT WWB G Lorraine	**Elle** TS – Ohh Ohh WT H	**Jack** WT WWB TS – Bi
Study 16, Day 6	Whole Class	Time 2.03.30	No. 33
(Teacher writes 6 raisins on the whiteboard) Pupils: Laugh Teacher: Now.. Pupil: Miss X? Teacher: Yes? Pupil: That means we don't make the chemical pop guns? Teacher: No I haven't said that. We're going to do that afterwards. We're going to do this one first. What you need to do... Jack: Make it really fast.			
Beth WT WWB WP	**Jeff** WT WWB Yawns Fidgets	**Elle** W around	**Jack** WT WWB Laughs Calls out: Make it really fast

FIGURE 4.1 Excerpt of 2 x 15-Second Intervals from Full Transcript Study 16, Day 6

This example (Figure 4.1) demonstrates the amount of information/data contained within each 15-second interval. This method of transcribing provides comprehensive and detailed information of contexts and behaviours throughout the series of studies. The two 15-second intervals (Figure 4.1) have recorded the teacher's dialogue with the class in general and specifically with Lorraine and another unidentified pupil. Lorraine was answering a question stating the term "sodium bicarbonate". In the second interval, an unidentified pupil was asking whether they would be doing "chemical pop-guns". The four target children - Beth, Jeff, Elle and Jack, were watching the teacher (WT) and the white-board initially (WWB). Elle raised her hand (H), and Jeff yawned and fidgeted. Jack called out "make it fast" in response to the teacher's statement that "we're going to do this one first". Jack's calling out suggests that he wanted to get

the experiment under discussion over and done with, so that they could get on with "chemical pop guns". Such hypotheses about internal cognitions and emotions were then explored in the video-cued interviews. The transcribed data were then coded for content and behaviours and analysed.

Coding Behaviours from the Transcripts

Throughout the studies, there were frequently four distinct overlapping components in a classroom session: (a) the instruction phase; (b) carrying out the activity; (c) preparing a report or writing up the outcomes of the activity; and (d) discussing the results (Nuthall, 2000). A comprehensive set of behaviour codes for both the teacher and target children was developed to code the transcribed behaviours in relation to these components. In addition, there were two further categories included to account for non task-related behaviours. All the behaviour codes (categories) were further sub-divided to account for the wide range of individual behaviours, which might occur within a category including interactions with peers or the teacher. These codes are listed below with the sub-categories included for Section C as an example. Within these sub-categories were further sub-divisions. A full list of the codes (Nuthall, 2000) and their subdivisions is included in Appendix 1 (pp. 451 - 453).

A. Getting and clarifying instructions
B. Interpreting instructions and organising resources
C. Carrying out the procedures required by instructions
   - C1 Individual organises and carries out the required procedure
     - 1.1 An individual organises and carries out the procedure
     - 1.2 Watching passively while others carry out the procedure
     - 1.3 One person tries to correct the activity
   - C2 Group carry out procedure together
   - C3 Peer group talking about observations and results
   - C4 Group talking about reasons, explanations
   - C5 Talking with the teacher about observations and results
   - C6 Talking with the teacher about reasons, explanations
   - C7 Teacher carries out procedure with the group, instructing them in detail, or modelling the procedure
   - C8 Group carries out an incorrect or misinterpreted procedure or an accident occurs with the materials

C9 Engaging in alternative and playful activities and uses of resources

D. Social interaction unrelated to procedures

E. Writing the report

F. Spending time doing nothing active

These behaviour codes enabled us to eventually quantify over a full session or study, the exact amount of time spent in the different activities. For example, a tally of the total "C 2" behaviours as per 15-second interval, provides the exact amount of time spent by the group carrying out the activity. Similarly, the total time spent gazing around by a target child would be found by a tally of the "D 1" codes.

Coding was done manually using two different types of coding sheets. Whole Class coding sheets included the coded content and target children's behaviours during whole class contexts as occurred in Figure 4.1. Individual or Group coding sheets included the coded content and the individual student's behaviours when target children were working in the group or individual contexts. These A4 coding sheets enabled up to 31 x 15-second intervals to be coded per page. This was important considering that classroom transcripts ranged from 200 x 15-second intervals in a 50-minute session, up to 360 x 15-second intervals in a 90-minute session. The original transcripts were readily identifiable and available if we wished to later examine a specific time frame based on the coded information.

Inter-Coder Reliability

Having been trained in the coding process by the Principal Investigator, the two research assistants (including myself) independently coded only those transcripts relevant to our individual research inquiries. Sample sheets from the relevant coded data were compared and the reliability calculated. Inter-coder reliability rates for the sampled individual sheets containing 31 coded events ranged from 83.87% to 96.77% (disagreement ranged from 5/31 to 1/31 x coded events respectively). In consultation with each other, we made adjustments to our coding to achieve 100% agreement. Where we could not agree, the Principal Investigator also coded the segment and all three results were discussed until consensus was reached.

Using the Quantified Coded Data

Quantifying the range of coded behaviours has assisted in identifying the overall extent of the target children' task engagement or other behaviours of interest. For example, throughout any given session, changes in behaviour were readily identified through changes in the coded behavioural data. Changes in the coded data interpreted against the context specifically identified the moment by moment antecedents to changes in behaviour, particularly in relation to task engagement. This method has provided the basis for analysing the experiences of all the target children presented in my thesis.

Specific behaviours of interest such as hand raising and making utterances, provided quantified evidence of their impact on individual target children's task engagement, in conjunction with "pin-pointing" relevant antecedents. For example the exact quantity of content-related utterances to peers indicated the exact degree to which the child was interacting with the content in the "semi-private system of peer interactions...largely invisible to the teacher" (Nuthall, 2000, p. 16). The non-content utterances indicated how social factors within the given context might be impacting the child's access to resources or to equal participation.

In summary, the coded data has provided a rich source of observation evidence, which has been used in the various triangulation processes. The coding process has enabled the transcribed data to be organised for quantitative and qualitative analyses in order to answer my research question. For example, analysis of the antecedents to target children's task engagement or non task engagement suggests reasons why the target children might or might not have engaged or complied with the teacher's instructions.

Video-Cued Interviews

Subsequent to the post-test, I conducted a series of semi-structured video-cued interviews. The target children were shown selected excerpts from the video-recordings of themselves and invited to talk about what they were thinking and feeling during these events. The purpose of the video-cued interviews was to obtain as much information from the target children as possible about their emotions during classroom learning tasks. These semi-structured interviews were conducted as a conversation while video-clips were played. All the target children enjoyed the opportunity of seeing themselves on video. Often the target children helped by using the remote control. I

respected the target children as the "experts" (Bogdan & Biklan, 1998, p. 97) on their own classroom experiences, treating them as valuable clients and collaborators in my research. As will be seen in the examples presented throughout my thesis, their honest and reflective responses were strong indicators of their safety and freedom to express themselves.

At the time of planning the first round of video-cued interviews I did not know whether these 9 to 11 year old children would be willing and/or able to discuss their internal mood or emotion states with me. In terms of the language of mood and emotion would we share the same definitions? How effectively would I handle the technology? My first interview was with Nellie (Study 13) who responded positively to the interview experience, even requesting a second interview. More specific interview aims and probes evolved over the six classroom studies based on both the earlier interview findings and my improving interview skills. Potter and Weatherall (1987) confirm that interview skills develop with experience.

> Bringing off an interview which systematically covers a range of topics, yet is open-ended enough to allow the respondents to elaborate on their views in a relatively naturalistic setting, is a craft skill that takes some developing (p. 165).

For example, through the experience of the earlier interviews, I found that communication was more effective through the use of the term "mood". This then became the shared verbal symbol or term, representing emotion system responses.

In the earlier studies prior to the Project on Learning (Nuthall, 1999), and up to Study 12, the interview questions focused on the target children's thinking, feelings and learning processes. Having taken over the task of conducting the video-cued interviews for Studies 13 – 18 as part of my research, I included questions about social processes and emotions (Appendix 2, p. 454). These questions elicited the target children's free choice (Rosenberg & Ekman, 1995) emotion vocabularies about their experiences during the classroom tasks. For example, early in his video-cued interview Bart pointed to himself on the video-clip and said, "I was angry there". Free choice explanations tended to elicit these or other "usual" emotions. Also included in the video-cued interviews as they evolved, were two additional types of interview probes, designed to standardise data collection across the target children for a portion of the interview.

First, commencing with Study 13, a list of emotion (or feeling state) words (stimuli) was presented to each target child for their response as to a time when they might have experienced

each of the emotions during school. The fixed choice (Rosenberg & Ekman, 1995) section of the interview included the commonly occurring emotion or mood words from emotion theory, together with the children's "usual" emotions as found in the literature on classroom-based emotion, mood or affect, such as happy, sad, angry and so on (Appendix 3, p. 455). The instruction was for the child to say the word out loud and tell me the first example (that popped into their head as they read the word) of a time when they had felt this mood or emotion in school. This probe sought the following data:

- the range of moods or emotions experienced during school
- whether the target children's use of the emotion words as presented, accurately reflected the words (verbal symbols) they had used during their descriptions of their emotions or moods within any given event. Would this fixed choice paradigm accurately reflect the verbal categories they had used in free labelling? (Rosenberg & Ekman, 1995)

This full list was used up until Study 16, following which the modified experience sampling mood data collection was used.

Second, a series of cloze statements relating to emotion, self-efficacy beliefs and goal orientation (Ames, 1992) attributions, was presented to target children in the Studies 15 to 18. Commencing with Study 15, a list of cloze self-statements such as "When I am doing maths I feel....", was presented to each target child. The instruction was for the child to say the first word which "popped into their head" to finish the sentence (Appendix 4, p. 455). These statements were "custom made" to reflect the unit of learning. For example in Study 16, the statements were "When I am doing science experiments, I feel...." The wording of these self-statements was designed to place them "in the memory of the moment" as they verbalised it. This was a slightly different version of the free choice paradigm (Rosenberg & Ekman, 1995), through providing the context in the statement. These additional questions also functioned as a further form of within-interview triangulation to determine the validity and reliability of the target children' descriptions of their own experience.

Interview Preparation and Structure

The preparation for the video-cued interviews occurred in three stages:

- identifying and selecting events of interest
- preparing an interview schedule
- preparing the cloze questions (described above)

Identifying Events of Interest

During the classroom observations, unexpected yet often typical events involving individual target children frequently occurred. For example a number of such events occurred during Study 17 on Day 7. At the commencement of this session Abby had a book snatched from her just as she had organised her resources for her individual task engagement. She then experienced delays in getting started on her work for the session. During the same session, Dion could not access the resource he needed for task engagement, while Lois and Joseph engaged in tasks for extended lengths of time. Because these events typified the classroom experience of these four target children, Day 7 was therefore a good example to analyse and explore further through video-cued interviews. My findings from the analysis of this session will be presented in Chapter Nine.

Another method of selecting events was based around the content. Where applicable, I selected events where target children were interacting (or engaging) with specific content relating to specific test items which the target children had *not* known initially, and had learned during the unit. This information was obtained from comparing the pre-test and post-test responses. Where possible, the types of learning interactions engaged in by the target children within a single classroom study were similar with regards to the identified item.

In Studies 17 and 18, I also included events where the target children were completing the modified experience sampling data collection. This provided a further perspective of these "on-line" events.

Preparing the Interview Schedule

For each study, I prepared a detailed interview schedule for each target child's specific video-cued mood related interviews. Each schedule was planned for specific target children by day/topic. Unfortunately because the observation and video/audio data were not transcribed immediately (due to the rapid accumulation of the extensive bulk of data) these schedules were prepared *without* the benefit of the full classroom transcripts such as those in Figure 4.1. For example, an excerpt from the video-cued interview schedule for Study 15 is outlined in Table 4.3.

Table 4.3

Selected Events from the Teacher's Video-Tape from Study 15, Day 1

Video-Tape[1]	Video-counter[2]	Time[3]	Event
T-CAM (W-1)	00.16	9.59.57am	On the mat. Reporting back on number of steps
T-CAM (W-1)	09.40	10.09.00am	Children run off to measure 3 objects

[1] Named as CAM
[2] Tape rewound
[3] Visible on video time-coder

The selected events for viewing occurred on Day 1 of Study 15 when the teacher was introducing the topic of perimeter in the first session of the unit (Table 4.3). As noted above, had the typed transcripts been available at this stage, the video selection process for these interviews would have been more precise. For example, the time of 9.59.57am would have been readily identifiable as Time 1, and 10.09.00am as Time 38 and so on. (These have been transcribed since.) In order to facilitate the process of selecting specific events during the interview, the videotapes were all re-wound to 00.00, which then gave the commencement of the session.

Table 4.3 includes specific times of interest from the first session, which was the introduction to the topic through two practical perimeter tasks. During this early part of the session, the children were all seated on the mat, in view of one the wide-angle lens cameras (T-CAM, W-1, Table 4.3), which was hooked up to the teacher's microphone. I planned to show these specific clips to each target child to introduce their first video-cued interview. This would function both as the target child's orientation to the interview process and as a focus for content-related questions about their emotions. The specific clips identified would not be played in isolation.

The videotapes were code-named, for example the teacher's camera (T-CAM, Table 4.3) and the target child's (Kellie's) camera as will be demonstrated in Table 4.4 below. The video-counter was the only external indicator when fast-forwarding or rewinding to specific events (Table 4.3). Occasionally the target children themselves took charge of the remote, and found the relevant "stops". Although the transcripts had not been typed, the time-coder was visible on the television monitor, which enabled the precise times to be recorded in the interview preparation (Table 4.3).

Where possible, during the interview, audio "cues" from the video segment (as heard through the television monitor) were also included on the audio-taped recording of the interview, as an event came under discussion. I also created alternative cues such as saying into the audio-recorder, "Day 1, 9.59.57am". This enabled the subsequent analysis of the target children's reports about specific events to be more accurate. This was another video-cued interview skill, which improved during the process of conducting 54 interviews. In the earlier interviews, I occasionally forgot to turn down the volume of the television monitor, or make specific note on the audiotape of the time shown on the time coder. This resulted in having to repeat the searching of video records after the interviews when it came to the analysis. Table 4.4 provides an excerpt of the video-cued interview schedule for the same session in Study 15 (Day 1) for Kellie, based on the videotape from her individual camera – KELLIE-CAM.

Table 4.4

Selected events from Kellie's video-tape from Study 15, Day 1

Video-Tape[1]	Video-Counter[2]	Time[3]	Event
KELLIE-CAM	00.29	9.59 am	On the mat- Kellie raises her hand, hear Kellie answering a question by 10.04.
	04.36	10.04 am	Kellie answers definition of perimeter.
	10.37	10.10 am	Kellie measuring at her own desk with Lois. Is corrected by Lois and appears ok about that.

[1] Named as CAM
[2] Tape rewound
[3] Visible on video time-coder

Table 4.4 includes three specific events, which I intended discussing during the first part of the interview. This video-clip on KELLIE-CAM (Table 4.4) captured the same event as that on T-CAM (Table 4.3). Kellie had answered a question from the teacher, which was recorded on both T-CAM and KELLIE-CAM. Dual recording of events frequently occurred throughout the studies for other target children also, and triangulated two perspectives of the same event.

Conducting the Video-Cued Interview

The video-cued interview technique evolved through six classroom studies (Studies 13 – 18). Each video-cued interview took place after the content-related interviews. The content-related interviews focused on the target children' cognitive processes, and typically included their descriptions of whatever came to mind including any mental pictures, feelings or thoughts. Therefore prior to the video-cued interviews, the target children had already experienced a semi-structured, child-centred interview format. They then anticipated the subsequent video-cued interviews with varying degrees of excitement, because they knew that I would be using the classroom videos in their interviews.

The pace was not rushed and interviews ranged in duration from 45 – 90 minutes. The target children were able to settle in to a session of watching themselves on video, and talking with me for up to an hour and a half (two sides of a C-90 audio tape) per interview. Although this sounds a long time, it fitted in with the existing school timetable, where 90 minutes of classroom time alternated with morning break, lunch-time and afternoon home time. Once the routine of chatting and looking at excerpts was underway, the time went quickly. Some target children preferred being interviewed to doing their school work. It is important to note however, that the teachers released target children only from classroom sessions from which their absence would not be detrimental to their individual learning outcomes.

The interviews were conducted in a separate room at a table with the television monitor, the video-recorder and audio tape-recorder in front of us. In Studies 13 and 14, the four target children were interviewed once, apart from Nellie who was interviewed twice (at her request). In Studies 15 – 18, the four target children were each interviewed twice. In Studies 17 and 18, six further target children (three boys and three girls each study, one of whom was interviewed twice) were also interviewed. In total, I conducted 54 video-cued interviews. For the purposes of my thesis, relevant excerpts from the 41 interviews of mainly the twenty-four target children have been analysed in relation to my research question.

Rapport was successfully established with these young target children through a reflective and empathetic interview process (Gordon, 1975). Early in the interview process the target children were gently oriented in to viewing themselves on video, firstly through viewing footage from the

wide-angle lens camera/s, and trying to identify and locate themselves in the classroom. For example, in the following interview excerpt with Nellie (Study 13):

Interviewer: Can you see where people are?
Nellie: Yep (looking closely at video). That's me (with a chuckle).

Occasionally this first viewing might elicit an emotion-system memory. For example in the following dialogue with Bart:

Interviewer: Who's that with their hand up, who do you think that is?
Bart (Study 13): I think it might be me.
Hear video playing – Teacher (T) saying "just because they were friends"
I: I think it is. Keep watching for a minute and see if you think it's you.
Hear another student on video talking to T, and T says "yes he did".
I: Can you remember what things you were doing that day?
B: Yeah (and) when I was putting my hand up the teacher wouldn't say Bart so I got really angry.

From these introductory conversations the target children were then introduced to the idea of seeing themselves closer up. There were differences in how they first responded to viewing themselves close up. For example Joseph commented on his behaviours on more than one occasion:

Joseph (1): I think I'm being stupid then (laughs)... You can tell by the expression on my face.
Joseph (2): Silent reading. I didn't realise that when I'm reading I just sort of fiddle with my body.

Other examples include Nellie (Study 13) who said that she felt "strange" and giggled during the first few minutes of seeing herself so closely. Edith (Study 13) found it "embarrassing". Justin (Study 13) laughed and thought he looked "weird". Others target children such as Bart (Study 13) paid more attention to working out what they were doing at the time.

Informed Consent for Recording Video-Cued Interviews

Consent was obtained from the target children for their video-cued interviews to be audio-recorded. I explained to the target children that the research team wanted to hear their ideas and opinions because we believe it is important to know what children feel and think about learning. I explained that any publications or reports would use their code names or a statement such as

"Children of this age have said...." The general response from the target children was that they appreciated the opportunity to be heard unconditionally.

At the conclusion of each interview I always thanked the target children for their assistance. The target children frequently thanked me in return. For example Tyler (Study 14) said, "Oh well thank you for giving me this opportunity to actually tell you what I know without like anyone interrupting me and telling me no this is total nonsense". Kitty (Study 15) said, "That is my pleasure to help you", as also did Kellie (Study 15) who said, "My pleasure".

Occasionally the target children were curious about their code names. For example Rhys (Study 15) suggested that his code name should be "science freak". When I explained to Rhys that the interview would be kept confidential, he said "Phew!" About typing up of the interviews, he said, "You're going to be there for a long time!" Tyler (Study 14) thought that his code name was "cool".

As with a number of the other target children, Tyler was also very concerned that nobody else should see his individual video, just in case "you might be picking your nose". Mike (Study 15) likes his privacy, but did not mind telling me about his thoughts because he "knew you're not going to spread it round the whole world". I also explained to the target children that their interview data was important evidence, particularly if people were surprised at the wisdom and understanding of children this age (9 – 11 years). Therefore my PhD supervisor or examiner might want proof of the transcripts. In such an event their code names would be used. For example as part of the discussion with Tyler (Study 14) above, I explained:

> "Somebody could sit and observe in a room and say (what pupils did),
> but then all you've got is their word for it and it might not be true. Because some people might make up stuff about research. So this is what you call data so that if somebody wanted - like someone in authority who wasn't a member of the public .....
> Especially because you made a very good point. If people think children don't know much they'll say *I can't believe that a child would say that* you know. And especially to do with mood or things about schooling because um when a class of children is sitting there quietly some people might think there's nothing going on". (Interviewer to Tyler, Study 14).

During the interviews, I frequently confirmed the target children' ongoing informed consent by giving them the opportunity to say whether they were feeling bored, or had enough or wanted to finish. Sometimes they were ready to finish earlier. Most target children were happy to keep

talking. For example Bart (Study 13) confirmed that he felt "relaxed and happy". Ned (Study 18) said that being interviewed is "well it's better than doing work". Jack (Study 16) was asked:

> Interviewer: How has this been? If you think about your mood now and you've been here for about an hour, how would you describe your feelings about having this interview?
> Jack: um Kind of interesting cos I've been watching it and talking at the same time.

Avoidance of Harm

Allowing children's voices to be heard also carries the responsibility for ensuring that no harm is done to them. Prevention of harm included absolute privacy during interview, by not including any inadvertent disclosures, which were not necessary to the research. Interviewing children about their emotions had the potential to elicit more information than they might have comfortably wished to divulge in retrospect. By focusing solely on the classroom context, the semi-structured interviews prevented any child's personal privacy from being invaded.

Bogdan and Biklen (1998) have identified the concerns among qualitative researchers about the risk of interviewers persuading their subjects to reveal themselves, perhaps to their detriment. They ask:

> Do we (qualitative researchers) persuade or seduce people into talking and revealing themselves? Finch (1984) for example, worries about the "extreme ease" with which women researchers can get information about their female informants, particularly if these women have had few opportunities to talk about the issues central to their lives that are raised by the researcher. The interviewer has to be careful not to exploit that trust (Bogdan & Biklan,1998, p. 99).

This issue was also of major concern to me. In treating the children as "experts" (Bogdan & Biklan, 1998, p. 97) on children's issues, it was important that I did not use flattery, respond too excitedly, or put words into their mouths. The reflective listening approach (Gordon, 1975) was used to communicate my genuine interest, and to respectfully clarify my understanding of what the student had said. For example I might ask, "Now, just to make sure I've got this right, do you mean .....?" or "Are you saying..?" If it appeared that I had misunderstood, the target children seemed to be prepared to correct me, as in the example below:

Libby (Study 18): Oh Jodie and me kind of have the same ideas.
Interviewer: So sometimes if Jodie said something you'd think oh yeah I feel like that too?
Libby: mm
I: And is that because you know you're like her?
L: Nnno - it's because I feel like that.

Most of the target children had not talked about their emotions or private attitudes to such an extent before. Therefore it was a novel experience for them. The audio-recording of these interviews provided interviewer accountability and protection for the children from inappropriate interviewing techniques.

Specific video-clips having the potential to elicit distress or negative emotions were not shown to the child. For example, when Abby (Study 17) had a book snatched off her within two minutes of the commencement of class on Day 7, her (reconstructed) reported memory of this event was that she had willingly lent the book. However, Abby had appeared upset at the time, had been unwilling to let the book go, and had been the victim of intimidation. I did not wish to undermine Abby's classroom coping strategies nor reinstate the negative emotional state, which had been evident during the recorded incident. Therefore Abby was not shown this event.

Minimising Interviewer and Interviewee Bias

The timing of the interviews after the observation phase assisted the interview process. By the time the target children were interviewed they felt they knew the researchers well, and rapport was readily established. To this extent the target children were already pre-disposed or biased *towards* being interviewed, especially when they knew that they would be looking at the videos. For example in Study 17, I was continually bombarded with requests from most of the class to be interviewed, such was the rapport and anecdotal evidence from those children who had been interviewed.

As described above, my preparation for the interviews was thorough and incorporated scrutiny of numerous hours of video footage to select relevant events. It was inevitable that I had to be selective due to the extensive data and considering the excessive number of interesting events occurring in a classroom on a daily basis. Determining the relevance of such events was at my own discretion. Alton-Lee (1984) acknowledges that "researcher assumptions, particularly those that influence the kinds of data selected, are hidden variables in most investigations" (p. 69).

Consequently, the selection of which specific video events to include, the interview questions and later the selection of specific interview excerpts for inclusion in my thesis, might all be subject to my own researcher bias. This variable in relation to discourse analysis of interviews, has been acknowledged by Potter and Weatherall (1987):

> It is important to realise that since the interview is no longer considered a research instrument for accurately revealing an unbiased set of opinions but seen as a conversational encounter, the researcher's questions become just as much a topic of analysis as the interviewee's answers....The linguistic nuance of the question is as important as the linguistic nuance of the answers (p. 165).

Although these interviews have not been subjected to a specific model of discourse analysis, they have been conducted and interpreted through my own belief and expectation that the children were honestly exploring this unusual and new (for them) topic of conversation, using their own language. They might well have been constructing their own meanings of mood at the time of the interview (during the discourse). I frequently encouraged them to hypothesise through questions such as "I wonder how that happens?" Discussing such abstract concepts relied on both interviewer and interviewee "sharing a complex symbolic representational system" (Potter & Weatherall, 1987, p. 9).

Ensuring Shared Language and Understanding of Emotion or Mood

Some target children had more emotion vocabulary and awareness of their own states than others had. To ensure that we shared a common understanding of the terminology of "mood", I clarified early in the interview what they thought a mood was. The target children generally understood mood to be related to how you feel such as in the examples below:

> Justin (Study 13): How you feel.
> Edith (Study 13): A wee bit like face expression and how you're feeling.
> Bart (Study 13): umm Angry or happy or something.
> Cathy (Study 14) Like what you feel kind of like in.
> Todd (Study 14): I think it's like um if one hour you're watching the All Blacks and they win that's like a happy thing, that would be a good mood, but if like the next hour one of your friends died that would be a bad thing so that you'd be in a bad mood.
> Kellie (Study 15): Like you can be happy or sad.

There were individual differences in the target children's use of specific emotion vocabulary. The target children' individual emotion or mood vocabularies were accepted and explored as to what they actually meant for them individually. As a result, the interview questions might differ in depending on how the target children responded. For example, in the excerpt below, Bart (Study 13) described a certain book he had been reading as "cool", and I then attempted to clarify what he meant by "cool":

Bart: umm If it's a good book it's quite cool to look at.
Interviewer: So what would cool be? Like adults mightn't use the word cool. What sort of word might an adult use?
B: umm Enjoyable or happy or something.
I: Oh yeah enjoyable or happy yeah that would make sense - just so I can understand, so that would be cool?
B: Yep.

Other target children had even less relevant vocabulary, which then required more probing to determine their mood states. For example, during Abby's (Study 17) first interview, it took a long sequence of probes to clarify whether she actually experienced any moods at all, and what she meant by feeling "ok". Abby had previously talked about feeling angry and grumpy on the mat, which I made reference to during the excerpt below:

I: Are there other moods that you've been in when you're sitting on the mat?
A: Nope.
I : Can you remember the architect visiting and showing you his little buildings?
A: Yep.
I: What sort of mood would you have been in that day?
A: um Can't remember.
I: Can't remember - so ... If the teacher's talking about a new topic .....were you in the same sort of mood when she talked about the video coming?*
*(this was a new topic coming up after we had finished our observations)
A: Nope.
I: What sort of mood would you have been in then?
A: Don't know.
I: You don't know, but would it have been angry – grumpy?
A: No.
I: OK.
Abby then gets quite animated talking about the video they are making about a fly getting caught in the toilet
I: What about when you were sitting on the mat listening and watching the internet things that Mrs X had down there, what was that like? Was that any different to this type of mat ?
A: Nope.
I: So what would you have been feeling there?

A: OK.
I: Just ok and your mood would have been?
A: Happy.
I: Happy so you would have been happy with that.

Eventually, Abby identified that "ok" correlates with a happy mood. Through this questioning process, I was trying to find a "mat" event where Abby might have recalled a specific mood experience. This questioning process was also coaching Abby in the language of mood, using her definitions so that I could understand her experience. Subsequently, Abby eventually used the mood terminology such as "happy" more readily. For example, Abby identified her favourite subject as reading and explained that she feels happy when she is reading. This gave a benchmark of "happy" which could then be used as a reference point for determining her mood during other activities. This process is demonstrated in the video-cued interview excerpt below:

Interviewer: What mood would you have been in when you were doing that task?
Abby: mm Happy.
I: Happy. Now compared to the reading happy what would that have been like?
A: Really happy.
I: Really happy. Would it be more than the reading happy you mean, or about the same?
A: About the same.
I: Now I know that art makes you happy. What about compared to art?
A: Very happy
I: So art would be very happy, but this wouldn't be as happy as that?
A: No
I: I think I've slightly misunderstood. So this happy - would that be as good as the reading happy?
A: Same.
I: The same yeah but not as good as the art happy?
A: No.

This was a time-consuming process requiring patience, empathy and acceptance of whatever verbal symbols were offered by the child. The dialogues above allowed time for pauses between answers, so that it was not a "rapid-fire" questioning approach as the short responses, followed by further questions (in the dialogue above) might suggest.

Irrespective of these vocabulary and awareness differences I felt privileged to discover - and like Davie (1996) was also impressed at - the depth of the target children' understanding of the psychology of emotion in relation to learning and socialising in the classroom. My own emotional reactions to the target children' explanations might have had the potential to bias the target children' responses for example, saying "awesome!" or "amazing!" in response to something

which had been said. However these emotional responses were a source of interview question "hunches...and building rapport" (Bogdan & Biklan, 1998, p. 92), and validated the children's experience, in a non-academic conversation. Exploring the target children' explanations in these ways minimised any potential bias due to making assumptions about what they meant.

Within-Interview (in-situ) Triangulation

Video-cued interviews have an advantage over guided recall interviews, in that the selected events are fully available to assist children's retrieval of their memories of the experience. This minimises errors in their reporting to the interviewer. In addition, perhaps through "mood congruent memory" (Mayer, McCormack & strong, 1995, p. 736), other general or specific aspects of target children' emotion responses in the classroom seemed to be more readily recalled. For example Nellie (Study 13) was discussing her mood while we were watching an event from Day 2:

Nellie: (I was) angry cos um they wouldn't give me the paper
Interviewer: Oh were you angry?
Nellie: Yes.
I: Oh, Ok cos they wouldn't give you the paper and you were saying (earlier) that you like to get your own way.
Nellie: mmm Cos I throw a tantrum.
I: Do you?
Nellie: Yes.
I: And do they work?
Nellie: Yes.
I: You don't have to show me one, but in a tantrum, what's that feeling?
Nellie: It's annoyed and angry.

In this dialogue I made no judgement about Nellie's tantrum-throwing strategy, but took a genuine interest in its usefulness to her. I was also confirming something she had said herself. A few minutes earlier in the interview, Nellie had been explaining her behaviour as we watched a specific video-clip. She had said, "I tried to get (the pen off her) because I like to get my own way (laughs)". I found myself frequently revisiting issues in this way and I enjoyed improving my memory technique through the 54 interviews. While this might indicate a certain amount of co-construction occurring in the context of the interview, this method became a form of "in-situ" triangulation, providing evidence of the target children' validity and reliability as informants. Their consistency confirmed that the target children were not biasing their answers towards saying what they thought I wanted to hear.

This approach also worked well from the child's perspective. For example, in the excerpt below, Rod (Study 18) noticed an apparent contradiction in his own views about learning boring and interesting material.

Rod (Study 18): um Cos like most boring things you learn more from them.
Interviewer: So you usually learn more from the boring things?
Rod: Yeah kind of but then like you learn quicker when you're Interested.
I: Yeah that's...
Rod: (interrupting) So it's kinda weird.
I: It's weird isn't it .. yeah let's think about that.

This was part of a conversation about whether school work should always be interesting. This issue is discussed in Chapter Nine. Prior to this excerpt, Rod had explained that it was hard to learn boring material, yet he found himself contradicting himself which was "weird". These insights were made possible by the relaxed atmosphere and his trust in the interview process as a means for my genuine interest and desire to understand what children think and feel about school and learning. This discussion is reported in Chapter Ten.

Validity and Reliability of Children's Self-Report Data

The "in-situ" triangulation process also confirmed both the validity and reliability of individual student's evidence. For example, Dion (Study 17) spoke about his experience of stress in the three separate excerpts below:

Dion 1: Well like I can't do it, like stressed, like I'm trying to do it and I can't do it.

Dion 2: It's like everything is in there (points to his mid-forehead) and I can't get the right things out of my head.

Dion 3: (watching himself hit his head on the video-clip) That's probably when I got stressed (laughs). Just a wee bit there.
Interviewer: What were you trying to do there?
Dion 3: um get it out of my.. I don't know whether I was getting it out of my head or what.... Yeah something out of my head.

The consistency of Dion's explanations demonstrates the validity of his definition of stress, and the reliability of his definition over time.

Summary of Video-Cued Interview Procedures

In summary, the video-cued interviews sought extensive and detailed retrospective self-report data of each target child's internal cognitive and emotional processes during classroom learning tasks. The interview process evolved over the series of six classroom studies, contributing towards an accurate triangulation process for specific events in which the variables of interest have been demonstrated. My initial purpose of obtaining as much information as possible from the target children in order to triangulate with the observation and video/audio-recorded data has been expanded to include an *internal* triangulation process, intrinsic to the interview itself. Transcript examples have demonstrated how I revisited specific data during the interview process, to confirm the validity and reliability of the target children' interview evidence.

The main purpose of the video-cued interviews was to understand the unique experience of each target child. While there has been a range of individual differences in the target children' vocabulary and awareness of their own states, the video-cued interview process has successfully achieved dialogue with each child. In meeting the target children on an equal basis, this interview process has gained in-depth insights to their perceptions and awareness of how they think they function, feel and learn in the elementary school classroom.

Modified Experience Sampling Methodology (ESM)

Much of the video-cued interview data was obtained up to and beyond two weeks after the unit of learning had been completed. As a further triangulation to confirm the reliability of these retrospective reports, I decided to try an "on-line" method of sampling their emotions during the observation phase of specific events, in the final two classroom studies. In this context, "on-line" refers to a report obtained during a specific activity, not to be confused with computer-related "on-line' terminology. The most appropriate method was to trial an on-line emotion probe through modifying the experience-sampling methodology (ESM) of Csikszentmihalyi (1975).

The experience sampling method (ESM) refers to a set of empirical methods designed to allow respondents to "document their thoughts, feelings, and actions, outside the walls of a laboratory and within the context of everyday life" (Christensen, Barrett, Bliss-Moreau & Kashchub, 2003, p. 53). ESM Data collection occurs through participants responding to repeated assessments at moments over the course of time while functioning within their natural settings (Scollon, Kim-

Prieto, & Diener, 2003). ESM studies can vary in terms of timing of sampling, duration and method of implementation (Christensen, Barrett, Bliss-Moreau, & Kaschub, 2003). Three contingency protocol options that currently tend to be used are interval contingent (pre-planned schedule); signal contingent (randomly or otherwise, the researcher beeps the participant); and event contingent (selected events only are sampled). Scollon et al (2003) suggest that ESM may have had its beginnings with Flugel's (1925, in Scollon et al, 2003) 30-day study of mood, while the modern approach is usually credited to Csikszentmihalyi and Larsen's (1987) investigation of adolescents in their natural environments. Csikszentmihalyi and Larsen (1992) state that "the most heuristic usefulness of ESM lies in its description of the patterns of an individual's daily experience" (Csikszentmihalyi & Larson, 1992, p. 55). Because the method obtains repeated measures of a person's activities, feelings and thoughts over time, ESM can also reveal subjective effects of specific events or any changes in the person's life over that time frame. By "adding up patterns within a person, it becomes possible to use ESM to evaluate the common experience of situations"(p. 55). Csikszentmihalyi & Larson (1992) acknowledge that a major limitation is ESM's reliance on respondents' self-reports, citing for example that an employees' self-reports to an employer would be suspect. However self-reports can be defended as "a very useful source of data" (p. 56), as Lazarus (1991) has also argued.

Other limitations include reactivity which is regarded as especially problematic for ESM studies, because repeated assessments may lead people to apply unusual attention to their internal states and own behaviours (Rathunde, 1993; Scollon et al., 2003). For example, completing mood measures seven times a day might alert someone to insights such as "I am the kind of person who is sad a lot" (Scollon et al., 2003, p. 19), or "I am happy when I am with my friends" (p. 19). This type of reflection may then "lead to behavioural changes such as spending more time with one's friends which in turn may change the person's moods" (p. 92). Alternatively, the ESM process may actually cause irritation or influence the recall of emotions.

Rathunde (1993) identifies another problem in that "the pager interrupts the very stream of experience one is hoping to measure. Therefore ESM is still a *reconstruction* of experience, albeit one that is made just a few minutes after being signalled. Such interruptions can be distracting to those wearing a pager" (p.6). Self-consciousness (in the context of other children or teens hearing it) due to others noticing the beep might also bias self-reports. ESM is also subject to other biases – there is no guarantee that the response is actually genuine. Social desirability or compliance may be alternative explanations. Finally, issues of privacy are likely to result in some

activities and some feelings not being reported (Rathunde, 1993, pp. 6-7). However, despite its shortcomings, Rathunde (1993) argues that ESM preserves empirical rigor, and can be thought of as a "systematic phenomenology" (p. 8) that randomly samples the stream of experience, yet retains the possibility of rigorous data analysis and hypothesis testing. "ESM answers the call for the greater use of multiple methods to study psychological phenomena" (Scollon et al, 2003, p. 8).

ESM Modified Measurement Tool

ESM generally uses a detailed self–report instrument seeking affect or emotion data, as well as information about other variables present at the time of reporting. ESM subjects may be signalled at various times to report their internal states, or they may report at scheduled times, or during specific events. When reporting, ESM subjects answer questions about their feelings, their cognitive processes such as what they were thinking about, and contextual information such as what they were doing, where they were, who they were with and so on, at the time. In our classroom studies, the contextual variables were already being recorded through the extensive observation and video/audio recording. Therefore all that was needed was to obtain an on-line self-report of the target children's emotions. As demonstrated in the literature review, ESM can be adapted to suit any research questions and contexts as appropriate.

As part of the modification, Likert or similar scales were not included as I thought that this would be too invasive of the event or activity and would require further coaching. The probes needed to be quick and easy to use – similar to taking a temperature (which these days is very quick using digital thermometers compared to three minutes it would take for the mercury to rise in the old days). For example Boekaerts' (2002) on-line motivation questionnaire (OMQ) would be far too complicated and time-consuming. Other methods requiring interviewing or assistance at the time of obtaining the data were also not appropriate. Even the abbreviated version used by Zelenski and Larsen (2000) took five minutes for their university students to complete. The eventual design for this modified experience sampling was an A5 sized slip of paper containing a range of emotion or mood words for the target children to select from to indicate how they might be feeling at that particular moment. Another consideration was that I was only seeking data as to the presence or not of these emotions, rather than their intensities.

The first version of the ESM emotion probe (Figure 4.2) was used in the Space Study (Study 17) and contained twelve words derived from the emotion vocabularies elicited from the earlier video-cued interviews. Based on the earlier target children's responses to my request for them to give me a school-related example of the occurrences of each of these emotions, in conjunction with the usual free choice examples, the twelve most frequently experienced words were selected for the ESM emotion probe (Figure 4.2).

Name			*Study*
Happy	Sad	Annoyed	Stressed
Bored	Interested	Curious	Nervous
Excited	Angry	Embarrassed	Relaxed
I'm actually feeling.....			
		Thank you very much	

FIGURE 4.2 On-line Emotion Probe for Modified ESM – Study 17

From the discussions on the theoretical perspectives of emotion and the literature review in earlier chapters, we can see that the twelve words on the emotion probe (Figure 4.2) also include Lazarus's (1991) non-emotions of interested, curious and excited. These frequently came up during the interviews so needed to be included. Annoyed and angry were both included, even though Lazarus had suggested that they might each reflect a dimension of the same emotion of anger. During the earlier interviews, the target children's explanations of angry and annoyed suggested that they might be separate experiences with different objects, so they did seem to warrant being included separately. Several target children had also earlier given learning-related examples of when they would feel stressed so this word was also included. Of the main emotions in common across the various emotion theorists, disgusted was the only one not included in this emotion probe. During the earlier interviews, the main reasons for the few target children reporting "disgusted" related to other children's eating habits. For example, Tyler said, "when someone's like eating a lunch that you know you wouldn't". Nellie said, "well C was being really gross and like sometimes, A she eats with her mouth open".

The A5 on-line ESM emotion probe (Figure 4.2) initially used pink paper and occasionally a different pastel such as blue or green (when the pink paper had run out). These ESM probes became known as the "mood slips" or "pink slips" and were used during Study 17 and the Aztecs

Study (Study 18). Using the label "mood slip" was verbally more convenient (basically easier to say than "emotion slip"). This label was still consistent with the working definition of emotion for my research, in trying to find out how the target children were actually feeling.

My original purpose of the mood slips was to obtain on-line data to support the qualitative analyses of the individual experience of each of the four target children in the two classroom studies. Similar to taking a temperature with a thermometer, I was seeking an emotional reading at the time of events to confirm the accuracy of the four target children's (from each study) retrospective self-report data in the later video-cued interviews. Because the identities of the target children were not disclosed until the end of each study, all the children in the class were treated the same. For example, they all wore microphones of which only those of the target children were "live". The same principle applied when obtaining the ESM data. Although originally intended for eliciting data mainly from the target children, other children - especially those in the immediate vicinity - were also handed the mood slips. A further rationale was that the target children frequently indicated that other children might be the source of their current mood or emotion. For example, "she's being annoying", or "the boys are annoying". Once again this was for the purpose of sampling the individual target children's social and emotional contexts to further inform the qualitative analyses.

Including other children based mainly on their proximity to or involvement with the target children meant that the total ESM sample size differed each day for each classroom. But sampling always included the target children unless they were absent. However, as a result I found myself with a whole new dataset, which I had not anticipated but which serendipitously (Meyer & Turner, 2002) opened up a whole new range of possibilities for analysis.

The mood slips were first trialled in Study 17. I was aware that this was a new initiative, which had not been discussed with the teacher and the children during the preliminary consultations. Therefore further consultation was required. Although the research team had already conducted a full classroom study earlier in the year in each of these classrooms, it was decided to not introduce this new methodology until the study was underway. In addition, it was not practical to circulate mood slips during whole class sessions where the children were expected to be fully attentive to the teacher. The Principal Investigator introduced the ESM data collection to the whole class. He explained that Ronnie (Veronica, this author) was interested in finding out about these sorts of things as part of us all finding out as much as we could about how children learn.

He explained that these pink slips had some words on them. If any word or words matched how they were feeling could they just circle the word or words. If none of the words matched, the children could choose a word of their own to describe how they were feeling and write it in the space provided. The children were told that they did not have to fill out the form if they did not want to and for privacy they were to fold the paper and hand it to myself or one of the observers. These forms would be only for the research.

Following the explanation of the ESM procedure, the mood slips were passed around. Nora (one of the non-target children) immediately said, "curious - I'm curious about..." and she then asked if they could choose more than one option. They were told that yes they certainly could circle more than one word if more than one word matched how they were feeling. The children appeared to be comfortable and willing to think about and circle the emotion words, attempting the task so readily that they had to be asked to wait until the process had been explained. Apart from this first trial on Day 4, the mood slips were circulated during classroom activities, using an event contingent protocol (Christensen et al., 2003).

When the mood slips were passed around the children were relatively quick to circle their emotion word choices - frequently within 15 to 30 seconds. Occasionally it might take longer. For example on Day 7 of Study 17, Abby started circling her emotion words at 11.42.15am and handed the folded slip to the observer at 11.42.45am, interrupting her work for only 30 seconds. Joseph took a little longer, reading the mood slip at 11.42.30am then asking himself: "What am I feeling?" He also responded to a remark from Timothy next to him about how to fill in the mood slip, folded the mood slip at 11.43.00am and handed it to the observer at 11.43.15am – 45 seconds later. In that last 15-second interval he was engaged in task related talk with Timothy saying, "They're called satellites Timothy". During the same session Dion engaged in conversation about the mood slip with Edmond and also with the observer and took 1 minute 15 seconds before opening up his book again, while Lois took 30 seconds. These examples indicate that circling the words did not interrupt "the stream of experience" (Rathunde, 1993, p. 8) to any great extent.

Following its successful use in Study 17, a second version included further states described by the children in relation to their experience, which I had not initially included on the first mood probe trialled. For example "tired" and "energetic" were "feeling" states identified by children in Study

17 in response to *"I'm actually feeling..."* (Figure 4.2). The second version (Figure 4.3) was used in Study 18.

Name			***Study***
Happy	Sad	Annoyed	Stressed
Bored	Interested	Curious	Nervous
Excited	Angry	Embarrassed	Relaxed
Tired	Frustrated	Anxious	Fun
Energetic			
I'm actually feeling.....			
		Thank you very much	

FIGURE 4.3 On-line Emotion Probe for Modified ESM - Study 18

The modified experience sampling methodology mood data collection was introduced on Day 5 for Study 18. In Study 18, the mood slips were also passed round during classroom activities. The modified ESM data has contributed both qualitative and quantitative analyses.

Qualitative Analyses of ESM Data

Qualitatively, ESM has provided the on-line emotions related to specific events in the classroom. The observation and video-audio recorded contextual data has also captured the context at the time and the target children's conversations during ESM. This means that the ESM data collection process itself has become part of the observation and video/audio-recorded data, thus providing the specific context for these on-line measures of specific events. Specific experience sampling events have also been included in the video-cued interviews, which has provided an opportunity for the target children to describe how they checked their emotions, and why. For example, when Joseph was explaining his choice to me during one interview he said, "ah I don't know eh (laughs). I probably I said I was stressed - that was because Timothy was being a pain but I really wasn't stressed I was just angry yeah but I didn't put that down, cos I didn't need to it wasn't really something that sort of stayed there". On one occasion Rod explained to me that he had circled happy and fun, "well I was happy cos I was having fun".

Although the original intention of the ESM data was qualitative to obtain on-line data to support the retrospective verbal data from the subjects, the total mood slip data have also become a bonus dataset as mentioned above.

Quantitative Analyses of ESM Data

Preliminary data from the mood slips were entered into an Excel spreadsheet with 51 rows, with each row representing one completed mood slip. Columns across the spreadsheet included one column for each emotion word (17 in total), and all relevant variables. For example, the children's code-names, age gender and class - whether Level 5 or 6, the number of positive and negative emotions circled, and so on. A second worksheet was then created for the data relating to individual children. This worksheet repeated any child average data from the main worksheet plus a few more categories. These data were entered as one row per child and the columns across included data such as the number of times that child had circled individual emotions totalled across the number of mood slips completed by that child, and so on. Where children had included their reasons on the mood slips these were also recorded.

Using these spreadsheets, a number of statistical analyses were computed in Excel, following which the full dataset was exported to STATISTICA, where further analyses were computed. The significant statistical findings are reported in Chapter Five.

Minimising the Potential for Bias

According to Bogdan and Biklen (1998) qualitative researchers "have wrestled over the years with charges that it is too easy for the prejudices and attitudes of the researcher to bias the data" (p. 33). They argue that this might predispose researchers to more anxiety than is necessary about controlling their biases. Therefore, their advice is to "lighten up...no matter how much you try you can not divorce your research and writing from your past experience" (p. 33). Smith (1998) also confirms that it is important that we acknowledge that it is not possible to be an "an invisible, distant observer" (p. 41), and that we should stop pretending that it *is* possible. In accepting that what is observed and noticed is filtered through the perceptions of the researcher, it was important to address all possible sources of bias.

Minimising Observer Bias

The main purpose of the observations and video/audio-recording was to obtain accurate detailed descriptions of the target children' behaviours, to include interactions with concepts, resources, peers, and the teacher. A set of behavioural observation codes was developed to incorporate "all concurrent, observable and potentially meaningful behaviours" (Alton-Lee, 1984, p. 72). These comprehensive codes prevented selective or biased observations. The observers were trained to both observe and record comprehensive descriptions of the target children's behaviours, and to correctly use the observation codes, so that as many behaviours as possible were recorded. In addition, the observers were asked to record their own impressions, some examples recorded being, "appears disinterested", "excited", "seems tired", "appeared to be off-task". The observers included an experienced elementary-school teacher (Sue Collins), a psychology major (myself), the late Professor Emeritus Professor Nuthall.

Observer bias was also minimised by rotating the observers around the target children. This enabled the different perceptions (above) to be applied to every target child. A further effect was that this confused any possible cues as to the identities of the target children. Finally, this minimised the risk of any observer developing an exclusive rapport with any individual target child, which might reduce the objectivity of the observer's recordings.

Inter-observer reliability was ongoing beyond the observation period, due to the video/audio recordings continuing to be available throughout the analysis process. The transcribers used both the observation data and the video/audio record as they typed the transcripts. This provided a third perspective as at the time of transcribing.

Minimising Observer Effect – Participant Bias

One of the risks of observation data collection methods is that the presence of the observer/s might influence the behaviour of their subjects. This is more likely to occur when the subjects are older children or adults who might try to alter their behaviours because they know they are part of a study (Smith, 1998). This risk might be anticipated as being even higher in this project because the children knew they were being video-recorded and they wanted to be part of the research. This risk was minimised by using miniature cameras (which were unobtrusive), the familiarisation process described above, and by the duration of the studies. Anne Smith (1998)

cites the finding of White and Watts (1973, in Smith, 1998) that conducting research over an extended period of time prevented their subjects - mothers with small babies who they argued might be likely to modify their behaviour in research situations – from "put(ting) up a front"(p. 46). We found this to be true of our target children also.

Elementary school classrooms in New Zealand receive numerous visitors during any given year, including student teachers, so that once the team became established in the first familiarisation procedure, we were accepted as part of the routine for the particular unit of learning. The teacher and children habituated to the presence of the cameras and the observers within the trial week. For example Camilla, the teacher in Study 14, said,

> "You forget about them once you're going. You're so wrapped up in what you want done for that day that I didn't really, don't register that you're there. Definitely not with the microphones or cameras" (Camilla, Teacher, Study 14).

During their video-cued interviews, I also asked the target children what it was like for them having us (the research team) in their classroom. Many of those asked thought it made no difference once they became used to it. Some target children were conscious that what they were doing might be caught on video. However, the consistency of the target children's behaviours observed over these extended durations confirmed that the observed behaviours were typical of their normal classroom behaviours. For example, in Study 17, there was an incident in which Abby's book was snatched by another child within one metre of the observer, which suggests that the perpetrator had forgotten that the video cameras were recording and confirmed the unobtrusiveness of the observers.

Some of the target children's responses to my question about our presence are included below:

> Nellie (Study 13): But you did have to be careful about what you said.
> Cathy (Study 14): I thought it was really cool cos you got to be videoed
> Kellie (Study 15): It wasn't really bad actually because you sort of didn't notice because you were busy with your work. And I didn't really mind.
> Kitty (Study 15): It felt quite good because like somebody was talking to you, like taking notice of what you were doing, to help you learn and stuff.
> Elle (Study 16): I hardly noticed you there
> Lois (Study 17): Just like even if you're here (I) just work as I normally do in class.

Nellie (Study 13) had worked out that the camera was directed at her desk because she could see her reflection in the lens. She was concerned about privacy and occasionally turned her microphone off to talk privately to the girls near her. Alternatively, a target child might speak deliberately in to the microphone using risky language. On one occasion Rhys and Kane (Study 15) experimented by leaving their microphones on when they went into the toilets, to see if there was any effect. Later during interview Rhys said to me that he actually felt embarrassed about it. Apart from this Rhys felt "alright" about us being in there and thought it made "no, not really" any difference to how he did his work.

Joseph (Study 17) said to me that the he was aware of the observers and cameras for " yeah the first week maybe a bit...(but he eventually) yeah - settled in - yeah (and laughed)". For example he was feeling in a humorous mood as the microphones were handed out on Day 9 and made a "zzzipp" motion across his mouth to the camera. He enjoyed seeing this event during the video-cued interview. A short time later during the same interview, Joseph watched a video-clip of himself reading a few minutes later on the same morning (Day 9, 11.38am). He noticed that he was wriggling around and fiddling while he was reading, and said to me, "Silent reading. I didn't realise that when I'm reading I just sort of like fiddle with my body". This confirms that despite having deliberately looked up at the camera a few minutes earlier, Joseph had already forgotten about it once he was engaged in his reading.

Lois (Study 17) also felt important being involved in a research project, as did a number of others. Because they had been consulted throughout, most of the children had some understanding of the purposes of the Project on Learning. However Kitty's view above reflected her individual perception that she might personally benefit from our research.

One of the "spin-off" effects or perceived bonuses of our presence was the teacher's choice of topic to study. For example, the responses of Beth (Study 16) and Rod (Study 18) to my question of our presence are presented below:

> Beth (Study 16): It was actually quite fun but yeah it was alright having the cameras up ...after a while I didn't really notice them.
> Interviewer: Yeah and what would have made it fun? You said it was fun.
> Beth: um Well we got to do all kinds of experiments.
>
> Interviewer to Rod (Study 18): Do you think there was anything different about school because we were there?
> Rod: um Yeah we had to do more topic work.

I: And what was that like for you?
Rod: um In some ways it was good and in some ways it was bad.
Rod: Well like some of it was fun. But like (you) get a bit sick of it after a while.

These explanations confirm that these target children thought that our presence made a difference to the topic under study rather than their own behaviours.

Summary of Bias Issues

In summary, the research team was not invisible, but we managed to "blend into the woodwork" (Bogdan & Biklen, 1998, p. 35). While this was observational research in the naturalistic setting of a classroom, it was naturalistic to the extent that there were researchers and video/audio technology present. The methodology has addressed the potential negative effects of this through the specific methods explained in this section. Particular strengths in addressing these potential negative effects included the comprehensive video/audio records, the extended duration of the observations, and the inclusion of the in-depth interviews. These multiple sources of data have enabled triangulation of the evidence.

Triangulation of Data

The validity of my research is strengthened by triangulation which is "at the heart of qualitative research's validity" (Davidson & Tolich, 2001, p. 34). The various triangulations possible - due to the multiple sources of data obtained in this research project - not only ensure its validity, but also provide a means by which the reliability of the target children's explanations can be assessed. This was particularly relevant for determining the reliability of their self-reports for the ESM data collection. Later statistical analyses using the ESM data confirmed their statistical reliability also. The qualitative triangulations relevant to my research include the following:

- The transcribers triangulated the observers' notes with the video and audio evidence of behaviours and events, to ensure that the transcript was a complete and accurate record of events.
- The video and audio-recorded behaviours were triangulated with the interview evidence and the modified ESM (Csikszentmihalyi, 1975) data to confirm the children's self-reported emotions.

- Within-interview triangulation of mood data within the video-cued interviews sought confirmation of the validity and reliability of the children's verbal self-report data.
- Observed and video-recorded behavioural data was triangulated with interview and ESM self-report data and task output achieved by the target children.

The various qualitative triangulations have demonstrated the congruence of the multiple sources of evidence across a range of different classroom contexts and events. This provides confidence in the target children as reliable and objective informants about their own typical responding. In turn, this permits some generalisations about children's experience of classroom emotions.

Generalisability

Generalisability refers to whether research findings will "hold up beyond the specific research target children and the setting involved" (Bogdan & Biklan, 1998, p. 34). The present research does not necessarily seek to generalise to the whole population. My research question sought to discover the role of mood or emotion in the learning task engagement of twenty-four individual target children across four different elementary school classroom settings.

However, the similarities of some aspects of emotion across the four different classrooms and the triangulations of the multiple sources of data from the individual classroom studies suggest a number of context-specific similarities and differences (across children and classrooms) in the role of emotion in children's learning task engagement. Individual differences which have been found to be unique to specific children can be argued as confirming the importance and fruitfulness of research "investigations of individual pupils in individual contexts" (Alton-Lee, 1984, p. 84). Conversely, similarities of context effects on the target children demonstrate "to which other settings and children (the findings are) generalisable" (Bogdan & Biklan, 1998, p. 33).

Because specific learning contexts might be similar in other classroom settings it might be possible to generalise in relation to specific variable clusters with similar children in similar settings. For example, from the findings of children's experience of boredom during prolonged sitting and listening, it is possible to derive some generalisations about the likely responses of other 9 – 11 year old children in similar contexts.

Summary of Methodology

In this chapter, I have described the multi-modal or multiple methodological data collection procedures used in my inquiry, which sought to answer the question as to the role of mood or emotion in children's learning task engagement in the elementary school classroom. Using a range of examples from each of the six classroom studies, various triangulation methods have also been demonstrated. As this chapter has demonstrated, the extensive and thorough multiple methodologies used in my research make possible a wide range of qualitative and quantitative analyses.

The following chapter will present the results of the statistical analyses of the modified experience sampling data. Subsequent chapters will present relevant qualitative findings, which both inform and support the themes arising from these results.

CHAPTER FIVE: STATISTICAL FINDINGS

> Rod: Yeah cos like you need to know all about what we're feeling like.
> Interviewer: You're saying you need to know that. Why do you think it would be good to know that?
> Rod: Because like you need to know like what we like doing and that if we're happy or if we're bored and what stuff we really like doing.
> Interviewer: Yeah and what would we do with that information?
> Rod: Well you use it to like so you know that (you) want people to see what children like, so you can do it.
> Interviewer: What would be the most important thing that I should know about this mood slip thing?
> Rod: Say like well it's important for you to know, like the most, um ah you need to know the most popular one, the one that's like used the most.
> Rod: Like the ones that are probably used the most are happy stressed bored interested

Rod – aged 9 years 4 months was one of the target children in Study 18. Maths is his favourite subject, and he has automatically taken a statistical perspective on the experience sampling methodology (ESM) (Csikszentmihalyi, 1975). To Rod, it seems logical that we would be interested in knowing what children like, in order to cater better for their needs. In addition he has intuitively made a prediction of the statistical findings. How accurate was he?

The purpose of this chapter is to present the statistical results from the modified experience sampling methodology (ESM) (Csikszentmihalyi, 1975). First, I shall briefly revise relevant aspects of the data collection process, followed by a summary of the overall results and general analyses. (The full ESM procedures have been described in detail in the previous chapter.) Next the results of correlational and factor analyses, which were then tested against a number of variables, including achievement level, gender, and learning outcomes, will be presented. I shall conclude this chapter by comparing these findings to the relevant literature. These findings will be used to support the argument that this modified and more simplified ESM procedure has potential for further development for measuring children's emotions during classroom activities.

Data collection Revised

Figure 5.1 provides an example of the modified experience sampling methodology (ESM) mood slip used for Study 18. As already explained, although they were referred to in common usage as "mood slips", these tools were sampling emotions in terms of the working definition for this research. The mood slips were circulated during classroom activities with the children taking a

few seconds to read through and circle the word or words that best matched how they were feeling at the time.

Name			Study
Happy	Sad	Annoyed	Stressed
Bored	Interested	Curious	Nervous
Excited	Angry	Embarrassed	Relaxed
Tired	Frustrated	Anxious	Fun
Energetic			
I'm actually feeling.....			
			Thank you very much

FIGURE 5.1 On-line Emotion Probe for Modified ESM– Study 18

ESM was conducted on five occasions during Study 17, and eighteen occasions during Study 18. Because the identities of the target children were not disclosed until the end of each study, all the children in the class were treated the same. For example, they all wore microphones of which only those of the target children were "live". The same principle applied when circulating the mood slips. Although originally intended for eliciting data from the target children only, other children were also handed the mood slips. As a result, sample size differed each day for each classroom, due to the varying numbers of children in the vicinity of and/or interacting with the four target children on each occasion of sampling.

In total, 61 different children from 23 samplings completed 504 mood slips, across the two classroom studies. Of these 61 children, 27 girls completed 249 mood slips while 34 boys completed 255 mood slips. In Study 17, apart from Day 7 when the sample size (*n)* was nine, *n* ranged from 17 to 27. In Study 18, *n* ranged from 14 to 23. The longer duration of Study 18 was reflected in the total of 405 mood slips compared to 99 from Study 17. Both classrooms were composite Year 5 and Year 6, with children's ages ranging from 9 years 8 months to 11 years six months (mean = 10.07 years, SD = .59). Year 5 children completed a total of 316 mood slips and Year 6 children a total of 163.

The timing of the ESM data collection was dictated by the classroom timetables which usually scheduled Science and Social Studies in the mornings and Art in the afternoons. Therefore ESM was conducted three times more frequently in the mornings compared to the afternoons, during

which 381 and 123 mood slips respectively were completed. The types of classroom activities sampled included group activities (217 mood slips) and individual activities (230 mood slips). In addition, in both studies a single whole class activity was also sampled with a total of 57 mood slips being completed. These events were the first trial of ESM in each classroom, when sampling occurred after a brief explanation of the procedure to the whole class. The main purpose of collecting these data was to find out what emotions might be reported during a range of activities.

Preliminary results – Frequencies of emotions or moods

The mood slips were tallied for frequencies of individual emotion words circled. Frequency was defined as the number of times the given emotion word was circled. Results are presented in Table 5.1.

Table 5.1

Frequencies and Percentages of Emotions circled by Study and in Total

	Study 17 – Space		Study 18 - Aztecs		Total	
Emotion	Frequency	Percent	Frequency	Percent	Frequency	Percent
Happy	55	56%	185	46%	240	48%
Interested	41	41%	135	33%	176	35%
Relaxed	26	26%	105	26%	131	26%
Excited	30	30%	89	22%	119	24%
Curious	24	24%	70	17%	94	19%
Energetic*	0	0%	55	14%	55	11%
Fun *	0	0%	105	26%	105	21%
Sad	9	9%	8	2%	17	3%
Annoyed	12	12%	38	9%	50	10%
Stressed	22	22%	27	7%	49	10%
Bored	19	19%	59	15%	78	15%
Nervous	9	9%	20	5%	29	6%
Angry	6	6%	10	2%	16	3%
Embarrassed	9	9%	5	1%	14	3%
Tired *	4	4%	91	22%	95	19%
Anxious *	0	0%	19	5%	19	4%
Frustrated *	0	0%	36	9%	36	7%

Note: Total $N = 504$; * =Emotion not given as an option in Study 17.

Study 17; $n = 99$; Study 18; $n = 405$

Table 5.1 indicates the specific emotion word circled, as frequency tallies and percentage frequencies for each classroom and in total. For this discussion the unit of analysis is the mood slip (Total N = 504). Positive emotions circled were happy, interested, relaxed, excited, fun, curious, and energetic. Negative emotions or moods circled were tired, bored, annoyed, stressed, frustrated, nervous, anxious, sad, angry, and embarrassed.

The most frequently circled emotion was happy (240 of the 504 mood slips – 48%), followed by interested (35%), relaxed (26%), excited (24%), fun (21%), tired (19%), curious (19%), bored (15%), energetic (11%), annoyed (10%), stressed (10%), and the remaining negative emotions (Table 5.1). It appears that Rod's prediction was accurate. The most frequently circled positive emotions according to Rod would be happy and interested, while the most frequently circled negative emotions would be bored and stressed. Recall that the mood slips had been modified between the Space Study and the Aztecs Study (Studies 17 and 18 respectively). The original mood slip had twelve emotions and tired, frustrated, anxious, fun and energetic were included for Study 18. In order to determine whether there were significant differences between the classrooms, t-tests were computed for each of the twelve emotion options available to both classes. Results are shown in Table 5.2.

Table 5.2
Results of T-tests of Classroom Differences

	Mean				Std Dev	
Emotion	Study 17	Study 18	t-value	p	Study 17	Study 18
Happy	0.51	0.42	1.05	0.30	0.40	0.27
Interested	0.39	0.34	0.55	0.58	0.35	0.29
Relaxed	0.28	0.32	-0.43	0.67	0.35	0.31
Excited	0.27	0.23	0.50	0.62	0.35	0.25
Curious	0.24	0.17	1.01	0.32	0.32	0.22
Sad	0.09	0.03	1.38	0.17	0.24	0.08
Annoyed	0.13	0.08	1.14	0.26	0.21	0.11
Stressed	0.20	0.07	2.30	0.03*	0.28	0.13
Bored	0.24	0.15	1.42	0.16	0.33	0.16
Nervous	0.09	0.05	1.20	0.23	0.16	0.10
Angry	0.06	0.03	1.02	0.31	0.16	0.06
Embarrassed	0.11	0.02	2.24	0.03*	0.24	0.05

Note: df=59, Study 17 n=28, Study 18 n=33
* Significant at p=0.05 level.

The *t*-tests found that there were significant differences for two emotions only. Children were more likely to report being stressed and embarrassed in Study 17. The classrooms did not differ in terms of the frequency of reporting any of the positive emotions.

The total mood slips were then sorted into three broad categories based on their overall valence. The positive category had mood slips with solely positive emotion words circled, negative mood slips had only negative emotions circled, and mixed mood slips had both positive and negative emotion words circled. The mood slips were tallied for each category and the results are presented in Table 5.3.

Table 5.3

Frequencies of Positive, Negative and Mixed Mood Slips

Emotions circled	Frequency	Percent	Mean number circled
Positive	254	50%	1.81
Mixed	144	29%	3.66
Negative	106	21%	2.34

Note: *N*=504

Fifty percent of the total mood slips were positive (Table 5.3). Twenty-one percent of the mood slips indicated only negative emotions and the remaining 29% were mixed emotions – meaning that both positive and negative emotion words were circled. A one-way analysis of variance with type of mood slip (positive, mixed, negative) as the factor performed on the number of words circled was significant, $F(2,501) = 36.61$ $p < 0.001$. Post Hoc Comparisons using Tukey's HSD (honestly significant difference) test (Hinkle, Wiersma, & Jurs, 1994) found that the mean number of emotion words per mood slip was highest for mixed emotions (3.66, Table 5.3), next highest for negative emotions only (2.34), and least for slips containing only positive emotions (1.81). This means that the mood slips with mixed emotions and negative emotions had - on average - more emotion words circled than the mood slips indicating only positive emotions.

A number of "other" emotions were included in response to "*I am actually feeling...*" on the mood slip (Figure 5.1), such as "fine" (7), "hot" (6), "normal" (3), "unexcited" (1), "hunky dory" (1), "not bad"(1). It was interesting to note that even with the simple format for data collection, the children were able to use the optional space on the mood slip to express their variable experiences. These findings will be discussed in the qualitative chapters later as relevant.

Correlational Analyses

Similar to the rationale of Zelenski and Larsen (2000) that the frequency tallies do not adequately reflect the complexity of the individual reports of emotion, I was also interested to find out whether there were systematic relationships between the emotions reported by the children. Chi-square tests of each emotion against every other emotion were first conducted and indicated a number of significant relationships between pairs of emotions. For example, the positive emotions were highly inter-related as also were the negative emotions.

Next, it was decided to model Zelenski and Larsen's (2000) correlational analyses of the average or aggregate emotion scores for each child. Because the mood slips for each classroom were not identical, the five emotions not included in the Study 17 (tired, frustrated, anxious, fun and energetic) were excluded from the aggregated correlational analyses. First, between-subjects correlations were computed for each classroom individually, with almost identical clusters of positive and negative emotions being found. Because there were no major differences between the two classrooms, also bearing in mind the small size of these samples, the data were then pooled for the subsequent analyses.

Between-Subjects Correlations

Between-subjects Pearson correlations were computed to determine whether there were consistent individual differences in the likelihood of experiencing particular emotions across time. These analyses used the average emotion scores for each child (i.e. with individual occurrences and absences of a particular emotion being scored as '1' and '0', respectively; the scores were summed across mood slips and divided by the number of mood slips). These average scores represented the probability that the child would report the particular emotion. Zelenski and Larsen (2000) and Scollon et al (2005) also used the mean occurrences of each emotion (each time that emotion was rated above zero) for each of their 82 subjects, to calculate their between-subjects correlations.

As explained by Zelenski and Larsen (2000), "a large between-subjects correlation between sadness and anger would suggest that people who tend to feel a lot of sadness also feel a lot of anger" (p. 181). The purpose of my correlations was similar. As one example, I was interested in

whether children who tended to feel interested might also be more likely to feel happy over successive reporting occasions. The between-subjects correlations are presented in Table 5.4.

Table 5.4

Between-Subjects Correlations

Emotion	Happy	Interest	Curious	Excited	Relax	Sad	Annoy	Stress	Bored	Nerv	Angry	Embarr
Happy	-											
Interest	.21	-										
Curious	.17	.42**	-									
Excited	.36**	.68***	.53***	-								
Relax	.07	.27*	.24	.28*	-							
Sad	.27*	-.11	.07	.09	.07	-						
Annoy	.10	.05	.19	.22	.02	.23	-					
Stress	.09	-.02	.11	.14	-.08	.33*	.28*	-				
Bored	-.18	-.28*	-.16	-.07	-.01	.09	.06	.23	-			
Nerv	.02	.23	.32*	.47***	.02	.29*	.33*	.38**	.25*	-		
Angry	.02	-.01	.10	.25	.15	.42*	.32*	.53***	.29*	.48***	-	
Embarr	.35*	.05	.17	.24	.07	.32*	.29*	.25	.46***	.45***	.41***	-

* $p < .05$. ** $p < .005$. *** $p < .001$

Three of the five positive emotions were significantly positively correlated with both positive and negative emotions (Table 5.4). For example, happy was significantly correlated with excited (r = .36; $p < .005$), but also with embarrassed (r = .35; $p < .05$) and sad (r = .27; $p < .05$). Curious was positively correlated with excited (r = .53; $p < .001$) and with nervous (r = .32; $p < .05$). Excited was also positively correlated with nervous (r = .47; $p < .001$).

Overall, the negative emotions tended to be positively correlated with each other. For example, bored was significantly positively correlated with embarrassed (r = .46; $p < .001$), angry (r = .29; $p < .005$), and nervous (r = .25; $p < .005$). Stressed was positively correlated with angry (r = .53; $p < .001$) nervous (r = .38; $p < 005$) and sad (r = .33; $p < .05$). The strongest positive relationship between negative emotions was obtained for stressed and angry, with r = .53 ($p < .001$). Similarly strong positive correlations were also obtained for nervous and angry (r = .48), embarrassed and bored (r = .46), embarrassed and nervous (r = .45). Embarrassed, sad, bored and nervous significantly and positively correlated with positive emotions.

In summary, it seems that children who tended to circle happy "a lot" (Zelenski & Larsen, 2000, p. 81) were *not* significantly more likely to circle interested. If children circled interested they were significantly more likely to circle curious, excited or relaxed, but not happy. If children

circled happy "a lot", they were significantly likely to also circle excited "a lot". However, if children reported feeling happy, curious or excited, this did not preclude them also circling a negative emotion, the most significant being sad (r = .27; $p < .05$) and embarrassed (r = .35; $p < .05$). Interested was the only positive emotion that was significantly positively correlated only with other positive emotions - namely excited (r = .68; $p < 001$) - the strongest relationship among all 12 emotions), curious (r = .42; $p < .005$) and relaxed (r = .27; $p < .05$).

Comparing these results to those of similar emotions from Zelenski and Larsen (2000), their between-subjects correlation for interested and excited was .75 compared to the present correlation at .68. For happy and interested their correlation was .56 compared to the present result at .21 (Table 5.4). Zelenksi and Larsen (2000) did not provide significance levels, so these cannot be compared. Their correlation between bored and interested was -.17, compared to the present correlation of -.28 (Table 5.4). Unfortunately, Zelenski and Larsen (2000) did not include embarrassed so this result cannot be compared.

These correlations confirm the complexity of each child's reported emotions over time. It is also noteworthy that because of its negative correlation with bored (r = - .28), interested was the only positive emotion negatively correlated with its "intuitive" opposite. Commonsense would lead us to expect that children who tended to report feeling interested would not also report feeling bored. As Zelenski and Larsen (2000) argued for one of their examples, it seems that for the children in the present classrooms, bored and interested between-subjects are "relatively independent" (p. 190).

Within-Subjects Correlations

In order to explore the level of internal consistency of the individual children's emotional experience, within-subject correlations were calculated. The main purpose was to discover whether particular emotions were related in terms of being likely to co-occur (or not) within a given individual on a given reporting occasion. Within-subject correlations "can be interpreted as indicating the extent to which, on average, two emotions tend to co-occur, or "blend" together during the same reporting occasion" (Zelenski & Larsen, 2000, p. 188). Blending of emotions has been termed "palette emotions" expressing a metaphor from the "mixing of paint colours on an artists palette" (Lazarus, 1991, p. 79). The notion of blending usually implies the co-occurrence

of more than one mood of the same valence (positive or negative). Emotion blends of opposite valences may reflect ambivalence.

For this analysis, using a method similar to Zelenski and Larsen (2000), each child's emotion scores were standardized and the resulting standardized scores were correlated across children (subjects). To accomplish this, raw scores for each emotion were transformed into standardized scores by dividing the difference between each raw score and the mean by the standard deviation (note that the mean and standard deviation were computed for each subject and emotion). This standardization using z-scores removed the between-subjects variance; effectively, each child was then serving as his or her own control. The standardized emotion scores were then pooled across subjects and reporting occasions and a correlation matrix was obtained. These results are reported in Table 5.5 below.

Table 5.5

Within-Subjects Correlations

Emotion	Happy	Interest	Curious	Excited	Relax	Sad	Annoy	Stress	Bored	Nerv	Angry	Embarr
Happy	-											
Interest	.11*	-										
Curious	.04	.21***	-									
Excited	.18***	.08	.05	-								
Relax	.24***	.09*	.15***	.07	-							
Sad	-.02	-.10*	-.08	.03	-.01	-						
Annoy	.14**	.07	-.03	.03	.06	.12*	-					
Stress	.06	.05	.01	.02	.07	.20***	.23***	-				
Bored	.18***	.12*	.04	.11*	.11*	.16***	.19***	.25***	-			
Nerv	-.07	.01	-.04	.02	.02	.19***	.09*	.15***	.13**	-		
Angry	.01	.00	-.02	.05	-.02	.28***	.17*	.28***	.20***	.25***	-	
Embarr	-.07	-.05	-.08	-.09*	.02	.30***	.15**	.15***	.19***	.32***	.31***	-

*p < .05, ** p < .005, *** p < .001

Within-subjects, happy was significantly positively correlated with five other emotions, including three positive and two negative emotions (Table 5.5). Happy was most significantly correlated with relaxed (r = .24; p < .001) and equally correlated with bored and excited (r = .18; p < .001). Happy was less significantly correlated with annoyed (r = .14; p < .005) and least with interested

(r = .11; p < .05) (Table 5.5). Interested had its strongest significant positive correlation with curious (r = .21; p < .001), and was also significantly correlated with bored (r = .12; p < .05). Interested was negatively correlated with sad (r = -.10; p < .05). In addition to their significantly positive correlations with happy, excited and relaxed had similar correlations with bored (r = .11; p < .05). Curious was the only positive emotion that was positively correlated with only other positive emotions.

The negative emotions were all significantly correlated with each other to a greater or lesser degree (Table 5.5). There were also several significant positive correlations between negative and positive emotions, such as annoyed with happy, and embarrassed with excited. Bored was significantly positively correlated with four positive emotions. The only emotion not significantly correlated with bored was curious. Stressed, nervous and angry were the only negative emotions to significantly correlate only with emotions of the same negative valence.

These results indicate some consistency in the co-occurrence of these emotions on a given reporting occasion. It was interesting to note that while the between-subjects correlation for happy and interested was not significant, the within-subjects correlation for these variables was positive and significant. This indicates that although there was no relationship in terms of individual differences in the overall frequency of reporting these emotions, in terms of variation in individual children's emotional experience across reporting occasions, happy and interested were positively correlated. This means that - over time - although children who circled happy were not significantly likely to circle interested as well, at any given moment the two states of happy and interested were significantly likely to co-occur for an individual child.

In several cases, within-subjects correlations between groups of mixed or ambivalent emotions differed from the between-subjects correlations for the same emotions. For example, while interested was significantly *negatively* correlated between-subjects with bored (r =-.28, p<.05, Table 5.4), there was a modest but significantly *positive* within-subjects correlation between interested and bored (r = .12, p< .05, Table 5.5). This means that across reporting occasions, students who reported being interested were less likely to be bored, but in terms of an individual's 'state' emotional experience, interested and bored were likely to co-occur. This means that although - in general - children who reported interested would not be significantly likely to also report bored, some children who did report interested on a given occasion were significantly

likely to also report bored. So that although the children were not usually bored and interested at the same time, it obviously did happen for some children on occasion in this sample.

In another example, there was almost no correlation between relaxed and bored (r = -.01, *ns* Table 5.4) between-subjects, yet the within-subjects correlation for these variables was positive and significant (Table 5.5). This means that although children circling relaxed were not usually bored as well, on occasion children did report feeling both relaxed and bored. These results may seem counterintuitive, and should be interpreted with caution due to sample size and no cause and effect demonstrated. Nevertheless, similar to Zelenski and Larsen (2000), the data do suggest that the overall pattern of within-subjects correlations was somewhat different from the between-subjects correlations. These results also support the situated or state perspective of emotion, because they indicate within-child variability across reporting occasions.

Average Within and Between-Subjects Correlations and Blends

In order to compare these differences and determine any statistical relationship between the within-subjects and between-subjects correlations for positive and negative emotions, the methods of Zelenski and Larsen (2000) were used as follows. Average correlations for both the between-subjects and within-subjects data were calculated. The average correlations were based on the absolute values of the correlations, and used Fisher's r-to-z transformation. The between-subjects inter-item (inter-emotion) correlations were .33 and .33 for both positive and negative emotions, meaning that, on average, both positive and negative emotions circled correlated equally at .33 with other positive and negative emotions circled. The average within-subject inter-item (inter-emotion) correlations were .12 for positive and .21 for negative emotions. In comparison, Zelenski and Larsen's (2000) between-subjects inter-item correlations were .57 and .58 for positive and negative emotions respectively, while their within-subjects inter-item correlations were .37 and .19 also respectively. Thus, compared to Zelenski and Larsen, the present average inter-item correlations were lower, but were greater overall for between-subjects than within-subjects correlations.

Although the present average correlations were not as large as those of Zelenski and Larsen (2000), the differences found were in the same direction, apart from the within-subjects negative emotion (inter-item) correlation. These differences in value may reflect the different data collection tools and sample sizes. For example, the present ESM data were collected through

dichotomous (yes/no) responding - the mood was either present (circled) or not, whereas Zelenski and Larsen's (2000) ESM tool used a 7-point unipolar scale. They sampled 82 university students who completed ESM reports three times daily over 28 days. As a result they had 5642 (of a possible 6888) forms to analyse compared to the present 504 reports from 61 children. However, for frequency calculation purposes, Zelenski and Larsen (2000) bypassed their dimensional unipolar scale ratings and reduced their data to mean frequencies of emotion occurrences per subject. Therefore for the between-subjects correlations their *n* was 82 compared to the present *n* of 61. The difference in *n* was much greater for the within-subjects correlations, theirs being 5642 emotion report forms compared to the present 504 mood slips.

The reason why the present average within-subjects negative emotion correlation was greater than the corresponding value for positive emotions, contrary to Zelenski and Larsen (2000), is unclear but may reflect differences in the emotion content of the ESM tools. We both had more negative emotion options than positive emotion options. Of their fifteen items, six were positive and nine were negative. Of the present twelve items, five were positive and seven were negative. Comparing the individual emotion options, there were both similarities and differences. For example both the present study and Zelenski and Larsen's study used excited, interested, happy, and relaxed as positive emotions. Zelenski and Larsen had included enthusiastic, which was not included in the present correlations as explained above. I had included curious, but Zelenski and Larsen had not. Both studies included the negative emotions of bored, sad, and angry. I had included annoyed, stressed, nervous, and embarrassed, compared to their inclusion of guilty, lonely, frustrated, anxious, disgusted, and afraid. As noted above, in the present sample embarrassed was highly correlated with all the other negative emotions, already indicating one major difference. Had the lists used in the two studies been identical the comparative findings may have been different.

Alternatively the different results may reflect a difference in the self-reporting of negative emotions by the present subjects (elementary school children) compared to their subjects (college/university students). The present within-subject data may have been decreased due to insufficient variance in emotions reported by some students, such as Abby or Lois who consistently reported happy. It is also possible that including the five extra emotion options for the second classroom may have also influenced the frequencies of the original twelve emotions circled in the second classroom. For example, being able to choose fun for the second classroom might have replaced a child's circling of happy or curious. So that even though the extra words

have been excluded from these correlational analyses, their impact may have already been an intrinsic part of the calculations.

Finally, the differences might accurately reflect differences in experience. We have already seen in the literature review, that children of similar age to the present sample feel negative emotions more than positive emotions during classroom activities (Yair, 2000) and pre-adolescent children are less likely than college students to report positive emotions during school-related activities (Csikszentmihalyi & Hunter, 2003).

Despite the potential shortcomings, the interesting finding from the present perspective is that these calculations were possible, and the results were logical and comparable to those of Zelenski and Larsen (2000). These results perhaps indicate the possibility of using more simplified ESM data collection tools for children in classroom settings in the future. As the literature review found, most tools used were too lengthy and complicated when it comes to needing a quick assessment of emotion.

Between-Subjects Factor Analysis

The correlational analyses have confirmed a number of significant relationships between different emotions. The correlations are suggestive of two main groups or dimensions of positive and negative emotions, consistent with a dimensional perspective. However, they also demonstrate the complexity of children's classroom emotions, because significant correlations have also been found with emotions of opposite valence. For similar reasons, Lazarus (1991) has reservations about correlational analyses in that they do not capture the subtle distinctions of emotion experience. But he does see "merit in simplifying generalizations for the purpose of examining which emotions are closer psychologically or further apart on a number of factors of meaning, and merit in merely trying to reduce redundancy" Lazarus (1991, p. 62). Allowing for the risk of blurring the subtleties of experience as well as losing environmental antecedent information, a principal components factor analysis was performed for the between-subjects correlations. The main purpose was to simplify the correlational results and to determine the major dimensions of the children's emotional experience. In applying this to the between-subjects correlations only, it was hoped that we might be able to describe individual differences in emotional experience using a relatively small number of factors, each including a cluster of discrete emotions. Depending on the factors obtained, these could be tested against variables of interest to my research question.

Fortunately also, there is such a wealth of qualitative data surrounding this ESM data, that rather than risking losing any environmental data, the factor analyses would help in the search for emotion's role, consistent with Lazarus's approval to reduce redundancy of data.

The present sample size posed a similar problem to that described by Scollon et al (2005). Because their individual groups of subjects (across cultures) numbered 33 to 94, they explained that they did not have enough individuals to conduct between-persons factor analysis within each culture (p. 42). The present total sample across the two classrooms was 61, which would be a small enough sample as it was. However, because the present total sample comprised two different classroom studies, in which the activities sampled were not exactly the same, the activities and the classrooms themselves could be confounded with individual differences in emotional experience reported. Therefore exploratory factor analyses were firstly conducted separately for each classroom. In both cases the obtained factor structure was highly similar to that found for the entire sample, reported below, with factors corresponding to negative and positive emotion clusters found. This indicates that each classroom was similar to each other and consistent with the total sample.

The method of varimax rotation was used to obtain the factor loadings. The eigenvalues from the first three factors are presented in Table 5.6. The corresponding 'scree plot' is shown in Figure 5.2. Eigenvalues demonstrate in order of significance the principal components of a dataset (Smith, 2002). The factors or components (basically individual emotions) comprising the tail or "scree" of the plot are of lesser significance and may be ignored. Examination of the Scree Plot (Figure 5.2) suggests that three factors should be extracted for the present data. As Table 5.6 shows, these three factors explained almost 57% of the total variance.

Table 5.6

Eigenvalues from Between-Subjects Factor Analysis

Factor	Eigenvalue	% of Total Variance	Cumulative Eigenvalue	Cumulative %
Factor 1	3.40	28.31	3.40	28.31
Factor 2	2.24	18.68	5.64	46.99
Factor 3	1.16	9.69	6.80	56.67

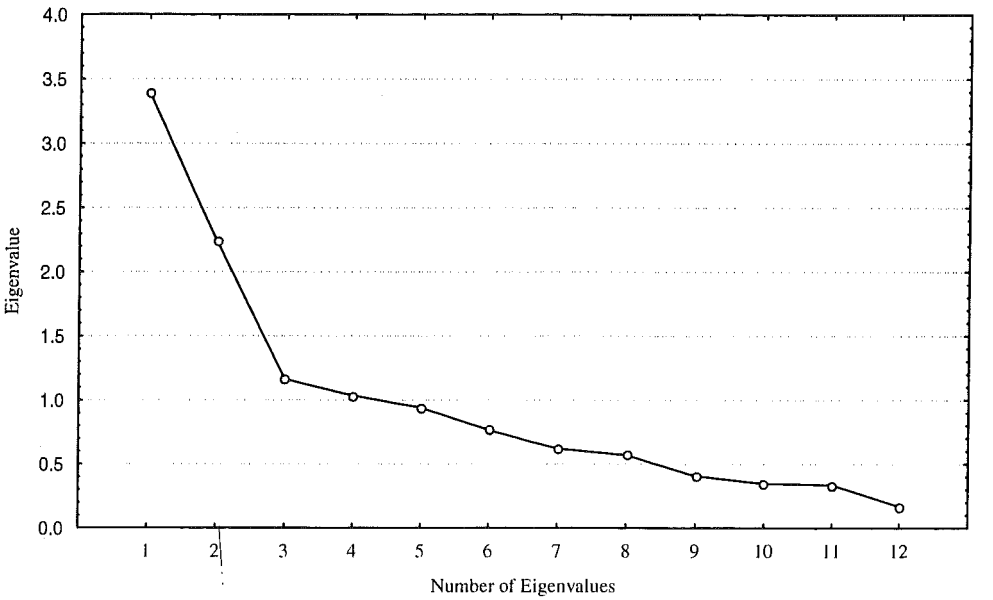

FIGURE 5.2 Plot of Eigenvalues for Between-Subjects Factor Analysis

Table 5.7 presents the factor loadings that were obtained using varimax rotation.

Table 5.7
Factor Analysis Between-Subjects

	Factor Loadings		
Emotion	Factor 1	Factor 2	Factor 3
Happy	0.08	0.19	0.87*
Interested	-0.10	0.84*	0.09
Curious	0.13	0.71*	0.10
Excited	0.24	0.84*	0.17
Relaxed	0.02	0.46	-0.04
Sad	0.55	-0.14	0.52
Annoyed	0.50	0.15	0.14
Stressed	0.67	-0.02	0.07
Bored	0.59	-0.26	-0.42
Nervous	0.70	0.39	-0.13
Angry	0.78*	0.08	-0.02
Embarrassed	0.69	0.08	0.21

Note: Extraction: Principal components. Varimax normalised.
*marked loadings are >.70; PrpTotl = proportion of total variance

Factors 1 and 2 include several emotions with loadings of .5 and above. Factor 1, comprising 28.31% of the variance (Table 5.6), is a cluster of negative emotions (Table 5.7). The highest loading was found for angry at .78, followed in order by nervous (.70), stressed (.67), embarrassed (.69), bored (.59), sad (.55) and annoyed (.50). Factor 2, comprising 18.68% of the total variance (Table 5.6), represents a cluster of positive emotions the three most significant being interested, excited and curious all above .7, followed by relaxed at .46 (Table 5.7). Happy has loaded separately onto Factor 3 above 0.8, followed by sad (.52) which is slightly less than its value in Factor 1 (Table 5.7).

These results (Table 5.7) show that there are two clusters, of negative and positive emotions respectively, that together account for 46.99% of the between-subjects variability. Happy has loaded significantly as a separate factor accounting for 9.69% of the total variance. These loadings were not unexpected given the correlations, and given the previous findings on two main dimensions of positive and negative affect. For example, Diener, Larson and Emmons (1984) conducted factor analysis on their mood scale data to find two major factors emerging. These were positive affect including the items happy, joyful, enjoyment, pleased, and negative affect including the items depressed, unhappy, frustrated, angry and worried. These and other findings cited on pleasant versus unpleasant affect, were cited by Zelenski and Larsen (2000) in their rationale for computing correlation statistics. Several factor analyses have also been reported in the literature review. For example, Yair's (2000) factor analysis included two factors denoting positive and negative affect. Pekrun et al's (2002a) factor analysis found four clusters of emotions. Enjoyment hope and pride loaded together, relief loaded separately, anxiety, shame and hopelessness loaded together, as did anger and boredom (Pekrun et al., 2002a). Scollon et al (2005) limited their factor analysis to two, obtaining a positive and a negative cluster accounting for 72% of their total frequency variance, which they then used to test against the variable of interest to them which was culture.

A further exploratory factor analysis of the total data including the five emotions *not* available to the Study 17 (fun, tired, energetic, frustrated, anxious), also found similar positive and negative emotion clusters as Factors 1 and 2, with happy loading separately as Factor 4. In that analysis, energetic and frustrated loaded as a "high-energy" ambivalent Factor 3. This result indicated that of the five extra emotions available to the Study 18 classroom, these two emotions together were significant for that class.

Results so Far

Data analysis commenced with simple frequency tables, through a series of correlational analyses and finally to principal components factor analyses. Between-subjects factor analysis has reduced the complexity of the data by extracting three main factors, with clusters of negative and positive emotions loading as separate factors and happy loading on its own as a third factor. Factor 2, comprising interested, curious, and excited, might be relevant for educational outcomes, because these emotions ought to facilitate engagement with classroom learning tasks or activities. It was therefore interesting to find that these three emotions loaded together were actually Lazarus's (1991) *non*-emotions of interested, curious and excited. Lazarus (1991) categorises interested and curious together with anticipation, amazement, alertness and surprise as "pre-emotions" (p. 83). Pre-emotions "refer to cognitive states that appear to have some heat or arousal" (p. 83), but which indicate an "orienting" or "waiting for the evidence on which appraisal of personal significance depends" (p. 83). Excited is categorised as "contentless excitement or arousal" (Lazarus, 1991, p. 83), which Lazarus sees as tending to be relevant in the context of stress rather than with emotions related to particular content. The present correlations and factor analysis have not demonstrated any significant relationship between stressed and excited for this sample. Because these results derive from the aggregated data, at this stage it is not possible to identify the specific contexts at the time of ESM sampling or to compare these contexts with those of Lazarus (1991). The relevant qualitative findings will be presented in subsequent chapters.

The seven negative emotions all loaded together onto Factor 1 are consistent with the findings of Boekaerts (1993, 2002), and confirm the tendency for negative emotions to be significantly correlated across the whole sample. It was also interesting to find that although "happy" was the most frequently circled emotion it did not feature in Factor 2 and loaded separately as a less significant Factor 3. This separate loading may represent a tendency for these children to report feeling happy as a global state, perhaps reflecting a different type of experience. How this experience differs from that of Factor 2 for example is not clear at this stage of the analysis.

The three factors obtained from the present sample may provide some support for the dimensional perspective of emotion in that Factor 1 is clearly negative, Factor 2 is positive (while also acknowledging Lazarus's categories) and Factor 3 consists of the single emotion, happy. The factor analysis has now simplified the correlational data to three broad categories. In order to find

out whether any of these factors were significant in terms of children's engagement in the activities sampled, further analyses were conducted.

Between-Subjects Factors and Other Variables

The between-subjects factor analysis has reduced the complexity of the individual differences in emotions. In order to determine whether any of these factors were significantly related to other variables, including educational achievement, gender, and learning outcomes, a series of correlations and t-tests was also computed. These results are presented in the following sections.

Emotion Factors and Achievement Level

Recall that the use of PAT (Reid et al., 1981) scores in the original stratified random sampling procedure to select the subjects for the Project on Learning has been explained in detail in the previous chapter. PAT scores are confidential to the teacher, yet anecdotal evidence shows that children in any given class "know" the identities of their highest and lowest achieving peers. This might be due to the ways that PAT scores are used to group children for instruction in maths, reading and spelling. In practice, PAT achievement becomes synonymous with perceived ability, with anecdotal evidence indicating that children prefer not to work with those children of perceived lesser ability. Similar to children's negative interpretations of even unsolicited teacher assistance to other children (Graham & Barker, 1990), children's achievement level might be emotionally relevant in classroom activities for social as well as academic reasons. In order to determine whether the factors obtained in the factor analysis might be related to PAT scores, a correlational analysis was conducted.

Factor scores were computed for each individual child by summing the average scores for those emotions that had loadings greater than .50 for each particular factor. The PAT percentiles for maths and comprehension were converted to z-scores assuming a normal distribution. These two PAT tests were chosen for this analysis as an earlier exploratory factor analysis indicated that these were the only two demonstrating any correlation with the emotion factors. In addition, the domain of mathematics has been implicated in earlier studies (Boekaerts, 2002), and reading comprehension skills were correlated with scholastic ability (Reid et al, 1981). The emotion factor scores were then correlated with the standardized PAT scores for Maths and Comprehension. These results are reported in Table 5.8.

Table 5.8
Correlations of Factor Scores and PAT Scores

	Factor			PAT Score	
Variable	Factor 1	Factor 2	Factor 3	Maths	Comprehension
Factor 1 n =61	-				
Factor 2 n =61	.13	-			
Factor 3 n =61	-.01	.34*	-		
PAT Score					
Maths n=50	.07	.40*	-.17	-	
Comprehension n =52	-.24	.05	-.03	.29*	-

Note: N varies due to pairwise correlations *Correlations significant at p=.05 level.

Table 5.8 demonstrates a significant positive correlation between PAT Maths and Factor 2. This indicates that children who were higher on Factor 2 emotions tended to have higher PAT Maths scores. In other words, children with higher PAT Maths scores significantly more frequently circled feeling interested, curious and excited. This was the only statistically significant correlation between emotion factors and achievement. It was also interesting to note that Factor 3 (Happy) significantly correlated with Factor 2 (Table 5.8). This indicates that the children reporting feeling interested, curious and excited were also significantly likely to be feeling happy.

PAT Comprehension did not significantly correlate with any of the three factors, although there was a non-significant negative relationship with Factor 1. This is worth noting because as discussed in the previous chapter, the PAT Reading Comprehension Test has a relatively high correlation with teachers' ratings of scholastic ability (Reid et al., 1981) and a high loading on a general academic ability factor (Hattie, 1979). Using these criteria then, it was interesting to note the lack of relationship between general academic ability and any of the significant emotion factors.

While PAT Maths has correlated as the most significant achievement test score, it is interesting to note that the classroom activities sampled were not specifically mathematically oriented. Although Space Topic (Study 17) was part of the science curriculum, the activities were heavily reliant on comprehension skills, as the children needed to read the tasks and choose which ones they would research. Similarly for Study 18, the children were expected to read and research their particular sub-topics on the Aztecs, and for the art component they had to make an Aztec mask.

These activities will be described in detail later. At this stage of the analysis it is not clear why the only statistically significant relationship was between PAT Maths and Factor 2 – the learning oriented emotions of interested, curious and excited.

Emotions and Gender

Previous research has found gender differences in school or classroom emotions in samples of children of similar ages to the children in my research. For example, girls worried more about tests and tried to please more than boys did (Altermatt & Pomerantz, 2003). In relation to maths achievement specifically, boys were more relaxed about maths tasks, whereas girls were more persistent after failure (Boekaerts, 2002). Girls experienced more negative emotions than boys during maths seatwork, and were also more concerned about negative feedback in maths (Prawat & Anderson, 1994). Prawat and Anderson also found that most of the negative affect in maths for both genders was "achievement related" (p. 210), this finding being comparable to the present findings, which demonstrated the converse - that higher positive emotions predicted higher Maths PAT achievement. Bearing in mind that the activities sampled were not part of the mathematics curriculum, I was interested to see what gender differences in emotions might be evident across all levels of achievement, as well as specifically investigating gender differences in the PAT - Factor findings above.

First the frequencies from Table 5.1 were sorted by gender. The average number of emotions circled on girls' mood slips was 3.00 compared to 2.27 for boys. This difference was not significant on a *t*-test. In terms of general mood, girls had more mixed emotions (both positive and negative emotions circled), and boys tended towards the extremes, being more positive and more negative than the girls ($\chi 2=12.65$, $p<.01$) as presented in Table 5.9.

Table 5.9

Percentages of Positive, Negative or Mixed Mood Slips by Gender

General mood	Girls	Boys
Negative	18%	24%
Mixed	35%	21%
Positive	46%	55%

Fifty-five percent of the moods slips completed by boys were wholly positive compared to 46% of mood slips completed by girls (Table 5.9). Almost a quarter of the mood slips completed by boys (24%) were wholly negative compared to 18% of girls' mood slips being negative. With 35% of girls' mood slips being mixed compared to 21% of boys' mood slips, it appears that girls were more likely to report ambivalence. Significant Chi square results of gender differences in the percentage frequencies of circling specific emotions are reported in Table 5.10 below.

Table 5.10

Significant Chi Square Results for Emotion by Gender

Emotion	Girls	Boys	Chi square value
Happy	56%	40%	13.28**
Interested	41%	29%	6.89**
Excited	33%	14%	28.23**
Curious	27%	11%	19.97**
Fun[a]	25%	17%	4.93*
Energetic[a]	15%	7%	7.89**
Anxious[a]	6%	2%	5.27*
Relaxed	22%	30%	3.90*
Bored	12%	19%	4.74*

Note. No significant gender differences were found for tired[a], annoyed, stressed, frustrated[a], nervous, sad, embarrassed and angry.
[a]Study 18 (Aztecs) only. *p<.05, **p<.01

As demonstrated in Table 5.10, girls reported the following emotions more frequently than boys did: happy, interested, excited, and curious. Boys reported relaxed and bored more frequently than girls did. Including the Aztecs Study (Study 18), girls also reported fun, energetic, tired and anxious more frequently than boys did. Based on these Chi square tests, girls have been confirmed as significantly more likely to report the Factor 2 emotions of interested, curious and excited and Factor 3 (Happy), as well as reporting more anxiety. This latter result applies to Study 18 only, which means that anxiety was not included in the factor analysis for the total sample.

In a separate analysis of gender and PAT scores, a significant and stronger correlation was found between Factor 2 and PAT Maths for girls ($r = 0.52$, $p<001$), compared to the corresponding correlation for boys, $r = .37$, ns. This suggests that there may be a stronger positive relationship between Factor 2 emotions reported during the activities and PAT Maths performance for the girls than for the boys. There was also a negative relationship between Factor 1 and PAT

Comprehension for boys that approached significance (r= -0.35, p < .09). This indicates a trend in our sample for boys with higher PAT Comprehension scores to be less likely to report the negative emotions comprising Factor 1.

The standardized PAT Maths and Comprehension scores for boys and girls were then compared with *t*-tests. These results are reported in Table 5.11.

Table 5.11

T-Tests of PAT Z-Scores by Gender

	Mean					Valid N		SD	
PAT Type	Girls	Boys	t-value	df	p	Girls	Boys	Girls	Boys
Maths	0.15	0.19	-0.10	48	0.92	24	26	1.17	1.02
Comp.	0.42	0.25	0.62	50	0.54	26	26	0.94	1.09

T-test results for the standardised PAT scores by gender demonstrated no significant differences between boys and girls in respect of their achievement as measured by PAT scores in Maths and Comprehension (Table 5.11). Comprehension scores were better than Maths for both genders, with the mean comprehension score for girls being almost half a standard deviation above the total mean, compared to boys at .25 above the mean, but this was not significant. There were similar distributions of scores for each gender, so that each classroom had very high and very low achieving boys and girls as well as scores in between. For example, between the classrooms the highest scoring boys in PAT Maths were Harry at 98 (Study 17), and Ned at 95 (Study 18), and the highest scoring girls were Kellie and Bernice both at 99 (Study 17) and Annabelle at 92 (Study 18). The two lowest scoring boys were Brendan at 23 (Study 17) and Mark at 15 (Study 18). The two lowest scoring girls were Abby at 21 (Study 17) and Beth at 15 (Study 18). Similar results were found for Comprehension, with the highest and lowest scores ranging from 1 to 98 and 34 to 99 for boys in Studies 17 and 18 respectively. For the girls, PAT Comprehension scores ranged from 5 to 99 and 36 to 98 in Studies 17 and 18 respectively.

The Chi square results have confirmed that girls overall were significantly more likely to circle Happy (Factor 3). In order to see whether there were any differences in Factor 1 and Factor 2 emotions across the full achievement range across both genders, *t*-tests were then computed using the between-subjects Factor scores against gender. These findings are reported in Table 5.12.

Table 5.12

T-Tests of Factor Scores by Gender

	Mean				SD		
Factor	Girls	Boys	t-value	p	Girls	Boys	F-ratio Variances
Factor 1	0.51	0.66	-0.87	0.39	0.46	0.84	3.36
Factor 2	1.10	0.58	2.88	0.01*	0.83	0.57	2.09

Note. Total df=59, Valid N girls=28, Valid N boys=33.
*Significant at p=.01 level.

The *t*-test results confirmed the significant differences between genders on Factor 2 (Table 5.12). The mean subscale score for girls was 1.095, almost twice the score of 0.577 for boys. Thus, girls across the whole sample – not just those with high PAT Maths achievement - were confirmed as more likely than boys were to report the Factor 2 emotions of interested, curious, and excited. This is also consistent with the finding that of the high achieving children of both genders, girls were more likely to report these emotions.

Gender and Achievement Results so Far

Summing up so far, the gender and achievement analyses have demonstrated the following:

- There were no significant overall gender differences in PAT maths or comprehension achievement across the two classrooms. This means that the PAT scores were similar across both genders, with each gender's achievement ranging from very high to very low achieving PAT test scores. Therefore the two classes contained boys and girls of similar achievement levels.
- Overall, girls were significantly more likely to report Factor 2 (interested, curious and excited) emotions than boys.
- Factor 2 scores were significantly positively correlated with PAT Maths across the total sample. This means that higher PAT Maths scores predicted an increased likelihood of reporting feeling interested, curious, and excited. Further analysis found that this correlation was greater for girls than for boys.
- PAT Comprehension scores did not significantly correlate with any emotion factor, although there was a negative relationship *approaching* significance between Factor 1 – the negative emotions cluster – and PAT comprehension for boys. If we concur with Hattie (1979) and Reid et al (1981), this suggests that there was no significant relationship between general

scholastic ability and any emotion factors. However, the potential for a higher PAT comprehension score to *reduce* the negative emotions for boys might be relevant at a qualitative level, particularly when we consider that the classroom activities sampled were more comprehension oriented than maths oriented.

In summary, it seems that the girls in the present sample who might be characterised as often feeling interested, curious and excited during the classroom activities sampled tended to have scored well in their PAT Maths. As noted, it was interesting to find this relationship with maths achievement, when the activities were not specifically mathematical.

From the statistical analyses so far, we have found both significant gender and general achievement differences in relation to Factor 2. I was also very interested in whether there would be any relationship between concept learning and the emotions experienced by the children during the classroom activities. From the literature review it seems that this is the most elusive specific relationship to find (Do & Schallert, 2004; Nicholls, Jones, & Hancock, 2003). The learning-related analyses are reported in the next section.

Emotion Factors, Pre-Test, Post-Test Scores and Items Learned

Nuthall (2001) had previously reported that "students already know at least 40-50% of what teachers intend them to learn" (p8). Because we had pre-test and post-test data on the new concepts that the teachers were hoping their children would learn, not only could we investigate whether new concepts were learned, but we could also investigate any relationship between the emotion factors and prior knowledge. Overall learning was defined as the total number of items learned, which was calculated as the difference between the post-test and pre-test scores. To determine whether learning was related to individual differences in emotion, correlations were computed and are presented in Table 5.13.

Table 5.13

Correlations of Factor Scores and Pre- and Post-Test Scores

Variable	Factor 1	Factor 2	Factor 3	Items Learnt	Pre-Test	Post-Test
Factor 1	-					
Factor 2	-.06	-				
Factor 3	.10	.29*	-			
Items Learnt	-.15	-.02	-.09	-		
Pre-Test	-.37*	.03	-.26	-.13	-	
Post-Test	-.42*	.02	-.28*	.43*	.84*	-

Note: N=55 due to casewise deletion of missing data.
*Correlations significant at p=.05 level.

Table 5.13 shows that there was no significant relationship between the total number of items learned and any of the emotion factors. Partial correlations were also computed between emotion factors and items learnt controlling for pre-test scores, with no significant relationships found. Non-significant correlations should be interpreted with caution, because of the relatively small sample size. We should not conclude that there is no relationship between an individual child's emotions during a specific activity sampled and whether or not she learnt something new from that activity, just because it was not statistically significant. The relationship between the specific events in which specific emotions were experienced and specific learning achieved or not achieved by individual children will also be addressed in the qualitative analyses.

Significant relationships were found for pre-test and post-test scores, both of which negatively correlated with Factor 1 (Table 5.11). Recall that Factor 1 is the negative emotion blend of angry, nervous, stressed, annoyed, bored and embarrassed (Table 5.6). Apart from a few exceptions, most children answered the same pre-test and post-test items correctly, so that a higher pre-test score would also generally predict a higher post-test score overall. It appears therefore that the higher the individual pre-test and subsequent post-test scores achieved by a child, the less likely that child would be to report negative emotions during the classroom activities sampled. Post-test scores also negatively correlated with Happy, although this correlation was not as strong as the post-test – Factor 1 correlation. This finding is similar to the former and suggests that children who were more likely to report being happy, knew fewer items at the post-test.

There was no significant relationship between Factor 2 (interested, curious and excited) and items learned, although one might have been expected. One possible explanation might be that the activities sampled were not relevant to the actual pre-test and post-test. Another possibility is that the items-learnt difference score was not a particularly sensitive measure of learning.

In a separate analysis including the five extra emotions in Study 18, pre-test scores also significantly positively correlated with Factor 3 emotions. This means for the Study 18 children that the higher their pre-test score the significantly more likely for that student to report feeling energetic and frustrated – what might be referred to as "high energy ambivalence". For this class also, Factor 3 was also significantly positively correlated with Factor 2, the positive blend of emotions which might be argued as supporting learning – interested, curious and excited.

Separate analyses were also conducted for each gender with pre-test, post-test scores and items learnt against Factors 1 and 2, and no significant effects were found.

Summary of Factor Results

The previous sections have reported the findings from analyses of the relationships between Factors 1, 2 and 3 and children's achievement, gender, and concept learning. The strongest positive correlation was between Factor 2 - the positive emotion blend of interested, curious and excited – and PAT Maths achievement. This correlation was stronger for girls than for boys. This particular result informs the more general gender difference found – that girls reported a significantly higher rate of Factor 2 positive emotions than did the boys. It may be that the self-reported emotional experience during these classroom activities is more predictive of their Maths achievement for girls than boys.

Discussion

This chapter has presented results of quantitative analyses that address several questions about children's experience of emotion during classroom activities. In order to answer my research question as to the role of emotion or mood in children's learning task engagement in the elementary school classroom, it was first necessary to find out what emotions were experienced overall. Subsequent questions investigated included whether these emotions were discrete or dimensional, and were they consistent over time. Latter analyses were made possible through

principal components factor analysis which provided summary variables, which could be used to test whether there was any relationship between emotion and children's level of general achievement.

The main purpose of the statistical analyses was to make sense of the quantitative data obtained through the modified ESM procedure. What has been achieved has been identification of the trends for this sample, and simplification in order to identify the main themes. One of the most important findings is that these data clearly demonstrate the validity of this modified ESM procedure with children in school. The statistical results presented and discussed in this chapter have confirmed the feasibility of having modelled the statistical methods of Zelenski and Larsen (2000). Many of the results correspond to those achieved with adults. For example the structure of emotion, the clusters of negative and positive emotions obtained in factor analysis, and greater consistency between-subjects rather than within subjects (Zelenski and Larsen, 2000). Children's emotions can be related to educational variables such as PAT achievement, and there are some reliable gender differences. These results are sensible, logical and consistent with theory and previous research. The results encourage confidence that it is possible to measure emotion in children using simple mood slips.

The findings have also demonstrated the utility of the mood slips in obtaining valid real-time emotion data from children during classroom activities. These generally took less than 30 seconds for the children to complete, barely interrupting the flow of consciousness (Rathunde, 1993) we were trying to measure. The results also confirm the reliability of these subjects (9 – 11 year old children) in self-reporting of their own states, and their perceptions of these. In addition we have also seen that 9-year old Rod has accurately predicted the frequency results. One of the more encouraging findings was that many of the present early results corresponded to those achieved with adult students, such as the correlations found by Zelenski and Larsen (2000).

Similar to the findings of Zelenski and Larsen (2000), the children in our two classrooms were "generally in a positive emotional state" (p.194). Despite some occasions of feeling bored or other negative emotions almost half the children overall reported feeling happy and positive during classroom activities. In terms of the tallies of reported frequencies of emotions in these two classrooms, it was encouraging to find that positive emotions outnumbered the negative emotions at a ratio of 2 to 1. This ratio was extended to almost 2.5:1 in the overall mood analysis, with 50% of children reporting feeling totally positive against 21% feeling totally negative.

However, there was a relatively large number - 29% of the total children - who reported mixed emotions, suggesting a high rate of ambivalence. Comparing the percentage frequencies from the two studies, 87.92% of Zelenski and Larsen's (2000) university students reported happy, compared to 48% of the present elementary school children. Comparative percentage frequencies for interested were 65.68% and 35% respectively. Similarly excited and bored were 64.19% and 44.09% respectively for the university students and 24% and 15% respectively for the present elementary school children. Therefore although both student groups were similar in the directions of these emotions, the elementary school children were less happy, interested and excited compared to the university students (Zelenski and Larsen did not include curious). They were also less bored, with Zelenski and Larsen's (2000) 44.09% compared to the present children at 15%. This might reflect a range of variables including the voluntary nature of university attendance and the congruence between the domain of psychology and the research project the university students were involved in, compared to the compulsory nature of elementary schooling and domains of study.

The children tended to circle more than one emotion word at each sampling. There were both within-child and between-children consistencies and differences in the specific emotion words circled at each sampling. Therefore, both between-subjects and within-subjects correlational analyses were conducted modelled on the methods of Zelenski and Larsen (2000). Similar to their findings, two main clusters of significantly related positive and negative emotions were found. These clusters of positive and negative emotion correlations perhaps indicate that these children – like Zelenski and Larsen's (2000) adult students – conform to a more dimensional model of emotion, with positive and negative emotions being relatively independent of each other. For example, children who were on average interested over time were less likely to be bored. When the average between and within-subjects correlations were compared, similar results to Zelenski and Larsen (2000) were also found, in that the between-subjects inter-emotion (inter-item) correlations were greater than the within-subjects inter-item correlations. This suggests that on a moment by moment basis, individual or state emotions of the same valence were less likely to co-occur, which – as Zelenski and Larsen (2000) would argue – suggests that discrete emotions vary individually depending on the situation at the time. This view is supported by the present data. For example, although bored and interested were not significantly correlated between-subjects, some children in our study did report feeling bored and interested on a moment by moment basis. Apart from the tendency of the children to report more negative emotion blends than positive emotion blends on a moment by moment basis, the present results overall were very similar to

those of Zelenski and Larsen (2000). It seems therefore that the present findings support theirs in that the children's average emotions over tend to conform to a dimensional model of emotions while their state emotions conformed to a discrete model of emotions.

Zelenski and Larsen (2000) acknowledge that the discrete versus dimensional debate about emotions becomes complicated because it overlaps with the debate on state versus trait emotions. Lazarus (1991) argues that aggregated data do not reflect personality traits, but rather they reflect similarities of context over time (as discussed in the emotion theory section). Lazarus (1991) also argues that the dimensional perspective based on the aggregated data may be misleading due to the details of the momentary or state adaptational encounters being lost. However by having both the between and within-subjects correlations this risk is minimised, because the very differences between these two indicate that situational or state variables are relevant. At this stage, these aggregated data are not being interpreted as supporting the presence of stable or enduring emotion traits.

Similar to Snow, Corno and Jackson (1996), these average or typical emotions reported by the children in the present study more likely reflect their learning history in these sorts of classroom activities or situations. As Jenkins and Oatley (1998) put it, "children develop biases of emotional responding.... because emotions are repeatedly elicited in their environment" (p. 46). Aggregated data cannot determine the role of environmental conditions or antecedents. Therefore the qualitative findings will be used in subsequent chapters to explore the environmental variables and their relevance to both the state versus trait, and discrete versus dimensional debates in relation to the children in the present study.

Based on the apparent consistencies in the between-subjects correlational data, a between-subjects factor analysis was conducted. Principal components factor analyses reduced the correlational data into three factors. Factors 1 and 2 obtained two main emotion components or blends, while Factor 3 loaded as one single emotion of Happy. Factor 1 obtained the negative emotions of angry, nervous, stressed, embarrassed, bored, annoyed and sad, and Factor 2 the positive emotions of interested, curious and excited. As noted earlier, these Factor 2 emotions have been categorised by Lazarus (1991) as non-emotions. As will be shown in the qualitative findings, interview data from the children tends to agree with Lazarus (1991) that curious and interested imply a "wait and see" approach, but disagrees with his view that excited occurs mainly in the context of stress.

While Happy loaded separately and less significantly between-subjects it was included with Factors 1 and 2 in a series of further tests. These three factors obtained were also consistent with the dimensional model of emotion because positive and negative emotions loaded on separate factors. The difference between Factors 2 and 3 is similar to the separating out of four academic emotion factors obtained by Pekrun et al (2002) from their series of studies of secondary school and university students (Pekrun et al., 2002a). The four factors obtained by Pekrun et al (2002) included two positive and two negative clusters, which they argued indicated different types of antecedents. In the academic context, they found that their two sets of clusters reflected both positive and negative anticipatory and reflective emotions related to academic activities. Pekrun et al (2002) argued that their different clusters "suggest that academic emotions can be grouped according to their antecedents" (p. 96), to which "it would pay to attend" (p. 165). Qualitative analyses will attend to specific events to determine whether this might be also true of the present data.

While acknowledging that I was not looking for personality traits, I was interested in whether the three factors obtained might correlate with other important variables. Therefore the factors were tested against educational achievement, gender and concept learning, with three significant relationships being found.

Factor 2 comprising the learning-oriented emotions of interested, curious and excited was significantly more likely to be reported by children who had achieved well in their Maths PAT tests. The higher Maths PAT score was a stronger significant predictor of Factor 2 emotions for girls than for boys. This was an interesting finding given the non-mathematical nature of the classroom activities sampled. There may be some relevant findings from the literature review worth considering in relation to this. Recall that Boekaerts (2002) had found that although girls (11 – 13 years of age) achieved better in maths, boys were more at ease and enthusiastic about maths compared to girls, although boys were more likely to avoid taxing academic demands. Girls on the other hand were more likely to persevere through failure in maths yet blame themselves more when maths did not go well. Girls were also found to be affected more by negative feedback on their maths (Prawat & Anderson, 1994), and to worry more about failure and experience more anxiety than boys (Altermatt & Pomerantz, 2003). When comparing these findings to the girls' reported emotions during the classroom activities sampled, it is possible that the girls in our study enjoyed the lack of pressure or fear of failure with these classroom activities compared to maths. However, it was also interesting that one of the significant Chi square gender

differences for our study was that girls experienced more anxiety than the boys did during these activities. However this did not translate in significance to the factor tests. That is not to say however that it is not significant at an individual level. Yair (2000) also found that students in the upper levels of achievement reported less active mood (which was his category for optimum mood) while engaged in learning. Similar to my findings, this was more likely for the girls than the boys. Authenticity of tasks improved students' moods (Yair, 2000). Boekaerts (2002) also found that domain-specific motivational beliefs mediate students' emotional states and effort investment in tasks.

Factor 1 was significantly negatively related to children's pre-test and post-test scores. This indicated that more prior knowledge as indicated by pre-test scores, was associated with a reduced likelihood of these children reporting negative emotions (angry, nervous, stressed, bored and annoyed). The lack of any significant positive relationship between the positive emotions in Factors 2 and 3 and learning achieved was consistent with the similar lack in the literature review. As noted earlier, it may be that the activities themselves did not relate to the test. It may also confirm that the aggregated data does not detect the moment by moment events in which new concepts may have been learned. Bearing in mind Nuthall's (2001) finding that children already know much of what they are taught and that each student learns uniquely different concepts during the course of a lesson depending on their prior knowledge, the qualitative findings will be important to consider in interpreting these results.

The final statistically significant finding from these analyses was that Factor 3 (Happy) was positively related to Factor 2 emotions. Happy was also significantly and negatively related to post-test scores, indicating that rather than predicting an improved score on the post-test, feeling happy during the activities predicted a lower post-test score. This finding might appear to contradict the experimental research findings from positive mood induction (Isen, 1990; Rader & Hughes, 2005) and mood-congruent recall (Mayer, McCormack & Strong, 1995). But this apparent contradiction may reflect differences in the research design, data collection and analyses. My research measured "happy's" naturally occurring frequency and its co-variance in the naturalistic setting of the classroom, as opposed to specifically inducing a happy mood. However, the present findings do show that happy is significantly related to interested, curious and excited, which are more significantly linked to achievement, than happy. If induced happiness is strongly linked to learning, it might be due to its significant relationship with interested, curious and excited. Based on the present findings - when happiness is induced, it

might be significantly likely to also induce interested, curious and excited. Having shown that Factor 2 is more important than happy, but that Factor 2 is significantly correlated with happy, this suggests that happy might predispose Factor 2. This correlation might explain why mood induction of happy helps learning and creativity. Through these statistical analyses we have been able to isolate more specifically the specific positive affect components that are significant.

Anecdotally we like to think that our children are happy, interested, curious and excited in school. We might also hope that they would be enjoying and learning from classroom activities, perhaps more so than just sitting listening to the teacher or being confined to their desks. To the casual observer in both these classrooms, the whole class generally appeared to be enjoying their activities and appeared engaged. Therefore it was not surprising to find that happy was the prevalent emotion, or that happy was significantly related to the learning-oriented emotions in Factor 2. However, just because happy was the most frequent emotion does not mean it was the most important emotion. The finding was that it was not significantly related to any learning related outcomes. Based on these findings, if we want to improve achievement we need to increase the Factor 2 emotions. Bearing in mind that only 35% of the children overall reported feeling interested, and less than 25% of the children reported curious or excited (Table 5.1), there would seem to be huge potential for improvement.

The prevalence of feeling happy - despite the presence of negative emotions, and despite the lower frequencies of interest, curiosity and excitement - across these two classroom contexts, is a positive and useful finding. For example, based on these results it may be easier to encourage children into experiencing the Factor 2 emotions – interested, curious, and excited – when they are happy. Previous research has found that positive mood fosters creative thinking (Isen, 1990; Pekrun, 1995). Hirt et al (1996) have suggested that people in positive moods find a task interesting "both because their mood directly affects their evaluation of the task, and because they perform it more creatively than people in other moods" (p. 256). The interested, curious and excited children in our classrooms were not significantly stressed, bored or angry. Therefore an increase in the frequencies of the Factor 2 emotions should not only increase the numbers of happy children it should also reduce the frequencies of negative emotions. Considering these classrooms were theoretically constructivist, which should be resulting in meaningful learning for all children in the class (Palincsar, 1998), to find that 15% of the children reported feeling bored, and 10% each reported annoyed and stressed during these classroom activities warrants further investigation.

In summary, the range of statistical analyses computed with the mood slip data has facilitated identification of important statistically significant variables relating to children's self-reports of their emotional experiences during classroom activities. As indicated throughout this discussion, the positive overall mood findings are encouraging but do not disguise the fact that for as many children who were generally feeling positive, there was a substantial number experiencing negative and mixed emotions - with 10% of children actually reporting stress in the classroom.

The next chapters will present the qualitative findings in relation to the significant variables identified in this chapter. Having analysed these complex data from the aggregated perspective, the qualitative analyses will use the momentary observation data and the in-depth video-cued interview data towards identifying relevant environmental variables associated with selected children and events. Through the qualitative analyses in conjunction with the statistical findings reported here, I plan to address the original research question regarding the role of mood or emotion in children's learning task engagement in the elementary school classroom. So far, the significance of emotion has been demonstrated but not its role.

CHAPTER SIX: CONTEXTS OF EMOTIONS

> Interviewer: What sort of sense does it make to you me asking these (questions)?
> Rod: Well you don't know all about it cos you don't know everything you just have the (mood) slips.

The purpose of this chapter is to present the overall qualitative findings relevant to the statistical findings in the previous chapter. We have the statistical results, but they only tell so much of the story. As Rod has also confirmed in his interview with me above, "just having the mood slips" doesn't mean we "know everything" we need to know. This chapter explores the classroom experiences of the target children qualitatively, in order to deepen our understanding of how specific contexts and events might relate to the target children's self-reports of their emotions. The particular emotions under scrutiny will be those identified in the statistical analyses as significant for this sample. For example, in this chapter I shall examine specific events during which the Factor 2 emotions of interested, curious and excited were reported by the target children, to see whether details of antecedents may be demonstrated. Similarly where the target children have reported the negative Factor 1 emotions or Factor 3 (Happy), these contexts will also be examined. I shall use relevant observation and video-cued interview data triangulated with the experience sampling data, to more fully inform the selected events.

Each classroom will be analysed separately. For the Space Study (Study 17), only five events were sampled, compared to eighteen events in the Aztecs Study (Study 18). Therefore I shall examine all five events in Study 17. For Study 18, I shall be more selective and will address the reasons for the selected events at the time. This chapter will conclude by comparing the qualitative findings from each classroom, in order to identify the specific environmental variables relevant to children's classroom adaptational encounters (Lazarus, 1991) that warrant further exploration and attention, towards answering my research question as to the role of emotion in children's learning task engagement.

Study 17 – The Space Study

Study 17 took place over nine days within a three-week time frame in July and August, 2000. In total there were eleven sessions dedicated to Science – *Making Sense of Planet Earth and Beyond*, this topic being eventually abbreviated to *Space Topic*. Seven sessions were held in the mornings and four in the afternoons. On Day 2 the teacher set up the "instruction evaluation

system" (Nuthall, 2000, p. 16) by allocating each child a set number of tasks to do within each of six categories based on Bloom's Taxonomy (Bloom, 1952). These categories were Knowledge, Comprehension, Analysis, Synthesis, Application and Evaluation. During the whole class instruction phase on Day 2, the teacher called out each child's name and the number of tasks per category allocated to that child. As each child was named, that child recorded their number next to the relevant category on their individual contract sheets. The contract sheets were signed by the children to confirm their acceptance of the number of tasks they had been given. The children were then free to undertake the tasks in any sequence they wished. However, based on the children's questions over the first couple of days, the teacher realised that she should have indicated which tasks were to be done first. She then numbered the tasks in order but not many children seemed to realise this.

The teacher had prepared a wide range of resources including various worksheets, posters and books, with the intention that they would be available as and when the children needed them for their tasks. A roster of half-hour slots was also set up for the computer so that the children could look up information, play space-related computer games, answer quizzes and so on. Generally, the sessions included phases of whole class instruction followed by phases of individual or group activities. The teacher also showed a couple of educational videos on Space to the whole class in the library, and took them on tours through specific websites such as NASA. There was one class outing - an evening visit to the observatory to see the night sky.

The main academic tasks were presented on eighteen individual academic task cards pinned to the notice board and arranged in sequence under their category headings. For example, Comprehension 1 was set out as shown in Figure 6.1.

COMPREHENSION 1
Describe what living in space is like for astronauts today. You could write this as an astronaut's diary.

FIGURE 6.1: The Task Card for Comprehension 1

Having read and chosen each task, the children were then required to either memorise it verbatim or to write it in their topic book before they left the notice board area to work at their own desks. A number of other less academic tasks were set out below the notice board, with A4 sized instruction sheets that the children could remove and use. In total there were more tasks available

(22) than the maximum number of tasks allocated to individual children. Table 6.1 demonstrates the allocation of tasks to each of the target children.

Table 6.1

The Numbers of Tasks allocated to and completed by the Four Target Children

Target Child	Number Allocated	Number Completed
Dion	7	2
Abby	8	5
Lois	16	13
Joseph	16	7

Lois and Joseph were each assigned sixteen tasks, in comparison to Abby and Dion with eight and seven tasks respectively (Table 6.1). As a result, Lois and Joseph had less choice overall from a total of 22 tasks across the six categories. This meant that they basically had to eliminate one task from each category. Dion and Abby had twice the amount of choice, due to having fewer tasks to complete from the total selection available. None of the subjects actually completed their full allocation of tasks (Table 6.1). The teacher later said that she thought this might be due to her original plan to spend six weeks on Space Topic, and not reducing the requirements to reflect the shorter time frame that eventuated.

By naming each child and allocating their specific numbers of tasks in the whole class context, the whole class heard her expectations of individual children. Such a process either created or reinforced whole class perceptions of individual children's competence and confirmed the higher academic status of those allocated more tasks to do. Apart from Abby, the target children were quite clear as to why different people had different numbers of tasks to do, as demonstrated in their answers to that question as follows:

> Dion: "Probably some people like can work quicker than others...yeah like Lois she can probably finish everythink on the first day.. (with a laugh) ...cos if someone's like real slow at work like gets three - has to do three knowledges and 2 analysises and all that like real high numbers then they probably wouldn't be able to finish by the end of five weeks".
>
> Lois: "She (the teacher) expects me to do quite a lot.....(others ask) Lois how come you're so brainy? How come that you're the teacher's pet? And like I'm not the teacher's pet and like some people they moan about it.... I see it as same as other people it's just that I um did more study."

> Joseph: "I got the highest that you get yeah (laugh) ...it means I'm quite smart and I can do things quickly. ... The kids that get less to do um are happy because they don't have to do as much as the other people, but if you get more to do well then you also feel quite happy cos you you've been taken that you're smart (laughs)."

Other than allocating the numbers of tasks, no other evaluation criteria were stated. In the absence of stated criteria, the children tend to interpret these themselves. From their comments above it seems that for these three children, completion itself was the main performance criterion. The quality of tasks actually completed also varied across the four children (Appendices 8 -11). Lois and Joseph produced several pages of written and illustrated work providing more detail than the work produced by Abby and Dion who wrote minimal answers. For example Dion wrote four lines in completion of one task, and a page of story for the second task.

Both Dion and Joseph above have also implied that completing tasks quickly is important and indicates that a child is smart. This makes sense if there is a set number of tasks to do. It becomes a list that needs to be worked through. The more tasks allocated shows that the teacher thinks a child is smart (Joseph) or brainy (Lois). However, despite Joseph being allocated the same number of tasks as Lois, he only completed seven compared to her thirteen tasks (Table 6.1). Dion's explanation has confirmed Lois's speed ranking compared to someone who is "real slow", and has also demonstrated his awareness of her academic status.

The numbers of tasks having been allocated on Day 2, the children were then free to start their activities. On Day 4, the modified experience sampling (ESM) of children's emotions was introduced.

The Four Target Children Across Time

Table 6.2 summarises each subject's individual mood slip data across the five events sampled. The words in italics are the child's own words in response to *I'm really feeling....*

Table 6.2

Time Series of Four Target Children's Emotions

Subject	Day 4	Day 5	Day 7	Day 8	Day 9
Abby	Happy Bored Curious Nervous	Happy Interested Excited Relaxed	Happy Interested Excited Relaxed	Happy Interested Excited Relaxed	Happy Interested Excited Relaxed *Fine*
Dion	Stressed Bored Angry	Happy Angry *Hungry*	Stressed	Stressed	Stressed
Lois	Happy Interested Curious Excited *Happy because I love school.*	Happy Interested Curious Excited *Good! I really love topic.*	Happy Interested Curious Excited *Brain working.*	Happy Interested Curious Excited	Happy Interested Curious Excited
Joseph	Happy Relaxed *Happy.*	Excited *Excited for lunch.*	Interested Relaxed *Interested & relaxed.*	Happy Interested Excited Relaxed *Excited to play on computer.*	Happy Interested Relaxed

These data were obtained during the late morning prior to lunch break (Table 6.2). On the last three days mood slips were passed round close to the same time each day. The emotion words circled each day by the target children were similar or almost identical each time. It is important to note that the children did not have the previous day's mood slips to refer to. The mood slips were passed around quite spontaneously at the observer's discretion, based on convenience, noting that the children were engaged in activities, and at a time when they have appeared to be on task, or engrossed or perhaps in flow (Csikszentmihalyi, 1975).

For ease of viewing the emotion data in Table 6.2, the following colour codes were used: blue for low arousal such as tired, bored, relaxed; green for interested, curious; yellow for nervous; red for excited, happy and fun, and maroon for stressed, embarrassed, angry, annoyed. These colours were chosen just on my personal preference and not on any scientific basis. We can see that Abby, Lois and Joseph have reported mainly positive emotions, compared to Dion who has reported mainly negative emotions. There appear to be within-subject consistencies over time and between-subject differences on a daily basis.

Between-Subjects Comparisons

Between-subjects we can see that on each ESM occasion there were individual differences in each target child's experience of each classroom event (Table 6.2). For example, on Day 4, Lois circled the Factor 2 emotions and happy. Abby also circled happy and curious, yet also circled bored and nervous. Joseph circled happy and relaxed, while Dion circled only Factor 1 emotions. On Day 5, the mood slips were passed round very close to lunch time as might be also indicated by Dion writing hungry, and Joseph writing excited fo lunch (sic). The next three days showed similar between-subjects differences.

Within-Subjects Comparisons

Across the five events the four target children were reasonably consistent. Joseph demonstrated the most variability, yet these variations were still consistently positive. Lois consistently reported the full Factor 2 emotions of interested curious and excited, while Abby consistently reported two of the Factor 2 emotions- interested and excited. Joseph reported partial Factor 2 emotions, as well as relaxed on most occasions. His reason for excited related to upcoming events such as lunch or working on the computer. Lois stopped offering her positive reasons by the fourth sampling event. This might relate to an event she experienced on Day 7 (to be discussed in Chapter Nine). Dion consistently reported the Factor 1 emotion of stressed. The only occasion he circled happy was on Day 5 when it was nearly lunch time, and he had been verbally interacting with peers.

Profiles Relating to Achievement, Gender and Concept Learning

Recall that the target children for the Project on Learning were selected based on their PAT average scores to represent lower and higher achieving children and gender. Based on the statistically significant findings in relation to PAT Maths and gender, the PAT Maths results for the four target children are reported in Table 6.3 below. In addition, in order to locate each of these four children in the emotion context of the total sample, their emotion factor percentiles are also included in Table 6.3. PAT Comprehension scores are also included as a comparison due to the perceived significance of this score in the classroom, although it was not statistically significant in these calculations. The Factor 1 and Factor 2 percentiles were obtained by

calculating the cumulative percentage frequencies of the average emotion scores for every child sampled.

Table 6.3

PAT Maths and Comprehension Scores and Emotion Factor Percentiles

	PAT Score		Emotion Factor Percentile	
Subject	Maths	Comprehension	Factor 1	Factor 2
Abby	21	26	45.90	88.52
Dion	61	52	90.16	14.75
Lois	96	60	14.75	100.00
Joseph	89	74	14.75	68.85

Lois had the highest PAT Maths score of 96 followed by Joseph at 89. Abby was the lowest achieving in PAT Maths at 21 and Dion was in the mid-range at 61 (Table 6.3). Percentile scores of 14.75 were obtained for Lois and Joseph on Emotion Factor 1 (the negative emotions cluster). This was the lowest percentile score available and indicates that these two children had circled *no* negative emotion words on their mood slips. These percentiles are consistent with the mood slip data presented in Table 6.2. Dion was in the 14.75th percentile for Factor 2 emotions (the positive emotions), which was also the lowest percentile available and indicated that Dion had not circled any of the Factor 2 emotions at all. In contrast, Dion was in a high percentile for Factor 1 (90.16, Table 6.5), accurately reflecting his frequency of circling stressed on the mood slips. Recall that there was an almost significant negative relationship between Factor 1 and PAT Comprehension for boys. Dion's PAT Comprehension score of 52 was lower than Joseph's at 74. In conjunction with the Factor 1 percentile data, Dion's higher percentile for Factor 1 emotions is consistent with his lower PAT Comprehension score compared to Joseph, who did not circle any Factor 1 emotions at all. Lois reported the full Factor 2 emotions on every occasion, so that she was in the 100th percentile.

Together with her PAT Maths score of 96, Lois fits the gender difference finding that girls with high PAT Maths were most likely to experience Factor 2 emotions during the activities sampled (Chapter Five). Joseph also had a high Maths PAT score, with an upper middle percentile of 68.85 for the Factor 2 emotions. While he did not report the full Factor 2 emotions, Joseph did regularly report interested and curious, this fits the gender difference finding that boys with high PAT Maths were less likely to report Factor 2 emotions than girls with high PAT Maths. He also fits the finding that boys with high PAT Maths scores were more likely to report Factor 2

emotions than boys with lower Maths PAT scores. However, Joseph was in a lower percentile than Abby for Factor 2, even though his Maths PAT score was higher than hers. This finding is contrary to the gender and achievement differences found in the factor correlations. Abby as the lowest achieving PAT Maths subject of the four, might not be expected to report the full Factor 2 emotions. Yet she was in the 88th percentile for Factor 2. Abby's high percentile is consistent with her mood slip circlings consistently including interested and curious but not including excited. Abby's one event of circling nervous and bored is reflected in her ranking in the 45.9th percentile for Factor 1. Apart from these latter findings, these four children appear to accurately reflect their percentile rankings in the ESM sample. Let us now take a look at their pre-test and post-test data and their individual concept learning presented in Table 6.4.

Table 6.4

Pre-test, Post-test scores[a] and Concept learning

Target Child	Pre-Test	Post-Test	Items Learned
Abby	17	35	18
Dion	32	37	5
Lois	42	43	1
Joseph	45	43	-2

[a] Out of 48.

From the pre-test data (Table 6.4) we can see that Joseph had the highest existing knowledge of the items tested, followed closely by Lois. Joseph "lost" or "unlearned" two concepts about space during this unit, whereas Lois learnt one new concept. Recall that these test items were designed to include the material planned by the teacher (Chapter Four). Dion demonstrated less prior knowledge of the topic and learnt five new concepts, while Abby with the least prior knowledge, learnt the most new concepts – more than doubling her score. Joseph and Lois did not have much room to move in their scores. Whatever other new learning they achieved could not be demonstrated in this test. It is interesting to note that despite their high pre-test scores suggesting high prior knowledge of the material, Joseph and Lois did not report feeling bored. Also interesting was that despite reporting stressed during these activities, Dion learnt five new concepts.

The correlation matrix for emotion factors against concept learning found no statistically significant relationship between these factors and the number of items learned (Chapter Five). However Factor 1 was negatively correlated with both pre-test and post-test scores. Lois and Joseph both had high pre-test scores and neither of them reported Factor 1 emotions. Dion had a

lower pre-test score and did report a high rate of Factor 1 emotions. Abby had the lowest pre-test score and reported nervous and bored on one occasion, apart from which she consistently reported Factor 2 emotions.

Learning Outcomes

Having briefly profiled the four target children from Study 17, individual differences are evident. Lois represents an example of the highest achieving girls with highest frequencies of Factor 2 emotions being reported. Dion represents an example of the mid- to- lower achieving boys who reported high frequencies of Factor 1 emotions. Joseph represents an example of the high achieving boys who reported Factor 2 emotions less than high achieving girls, and Abby is the exception in her category.

As a very low achieving girl, Abby has broken the mold, and is located in the high percentiles for Factor 2 emotions, as well as having improved her test score the most overall. One possible explanation for this disparity may be her lower pre-test score to begin with. Using the pre-test measure, Abby had the most room to improve, while Lois and Joseph could only improve by six and three items respectively. However, Lois only gained one new item and Joseph lost marks. This latter result suggests either carelessness or that Joseph did not actually know the answer in the first place and had made a lucky guess in the pre-test. As discussed in the previous chapter, these findings might also reflect the lack of relevance of the events sampled to the pre- and post-tests.

Three post-test items *not* included in the statistical analyses, yet providing an opportunity for the children to demonstrate their individual learning achieved, were as follows:

Item 1: What is the most interesting thing you found out?
Final question: What activity did you like best?
What else did you like doing?

During their content-related interview, the target children also answered these questions verbally (without their scripts). The four children wrote the following answers onto their post-test scripts.

Item 1: What was the most interesting thing you found out?

Lois: The sun is 15,000 degrees C in the inside. Mars is rusty. Saturn is the god of farmers.:

Joseph:That Saturn has 16 moon and mars is named after god of war.
Abby: Jupiter has 16 moons
Dion: That Saturn's rings are made of ice dust and rock

During the target children's individual content interviews which were conducted at least one week later, Lois, Joseph and Dion each verbally confirmed that the same fact they had written in their post-tests above, was the most interesting thing they had learned. Abby gave a different example during interview. She said the most interesting thing she had learned was that "a thousand moons can fit inside Jupiter". Abby said that she had learned this from the video. Dion said he learned his interesting fact from "this cool fact book". Lois got her facts from books and from Rhys, "cos Rhys knows a lot about space". Joseph also learned his fact from the video.

What activity did you like best?

Lois:	Answering and finding facts about space; watching video and finding more facts.
Joseph:	Write a story
Abby:	Making ailen (sic)
Dion:	Watching the vidos (sic)

During their content interviews the target children also talked about their favourite activities. For example Lois explained that she liked "everything (about Space Topic because) I like reading books and finding facts". Lois also liked the visit to the observatory. Joseph confirmed that he had enjoyed writing his story, "cos I like writing stories, and just thinking about it". Joseph explained that the ideas "just pop into my head, and normally because I read a lot of Paul Jennings books and they normally write about stuff like that". Abby confirmed that making the space creatures (aliens) was the activity she liked best. Abby also said that she liked making her word find. Dion said "probably the videos" were the activities he had most liked. He also said that he likes reading.

What else did you like doing?

Lois:	Finding more facts
Joseph:	Playing on the computer
Abby:	Learning about stuff
Dion:	Writing facts about space

The target children's answers indicate that the most interesting thing they learned tended to persist as knowledge gained for at least one week beyond the end of the study. This learning also indicates that there were learning moments other than those that might have been included the

experience sampling (ESM) (Csikszentmihalyi, 1975). For example, ESM was not conducted during their viewing of the videos, nor when Dion was reading or when Abby was making her alien. However, ESM did capture Abby creating her word find on Day 7. Therefore in order to find the relevance of the above ESM data qualitatively, two types of further analysis were required.

First, observation and audio/video records together with the video-cued interview data have elicited the relevant contextual and within-child variables, in relation to the five specific events sampled. Next, video-cued interviews have elicited what emotions the target children were feeling during other events in which specific learning outcomes were achieved or specific activities were being undertaken. A further relevant point is that before the activities were undertaken, the children had to choose them from the full selection available. Therefore the qualitative analysis has also investigated the question of whether the target children's emotions were relevant in deciding which tasks they would or would not do. The next section reports the qualitative findings in relation to the five ESM events above.

Events and Environmental Variables at the Time of ESM

The following sections will provide a brief description of the contexts of the ESM events, summarised in Table 6.4. Both relevant environmental and within-child variables will be identified. Nuthall (2000) has identified four classroom contexts, acknowledging the complexity and variety of the classroom variables influencing children's participation in activities. Lessons and classroom activities take place within four classroom contexts or systems, "only one of which is under teacher control (and each of which) has its own rules, procedures and outcomes" (Nuthall, 2000, p 16). Three of the systems are socio-cultural, and the fourth is physical. The three socio-cultural contexts or systems include:

(1) the public system of the classroom activities generally managed by the teacher,
(2) the semi-private system of peer interactions and relationships that is partly visible, but largely invisible to the teacher; and
(3) the private or internal system of the student's cognitive and emotional processes (Nuthall, 2000).

The fourth system or context is the physical context of the classroom within which classroom activities are conducted, and consists of any and all affordances for student engagement in learning activities. This includes the layout of desks, the location and size of the whiteboard, books, posters and any physical resource or event that is required for an activity to be carried out.

The Instruction-Evaluation System

This system or context is more directly under the teacher's control on a moment by moment basis. It refers to the activities designed, organised and managed by the teacher - both directly in face-to-face interactions with students, and indirectly through individual and group tasks. In Studies 17 and 18, this context included the instruction phases of the lesson, the allocation of tasks to children, the specific task instructions, the teacher's expectations of children's performance and so on.

The Semi-Private or Social Interaction System

This system or context acknowledges the impact of social interactions on student learning, their engagement in classroom tasks and activities, and their access to resources. In Studies 17 and 18, where the children were working with others and even when they were instructed to work individually, social interactions were frequently in progress during experience sampling events.

The Private or Internal System

Sometimes referred to as the student's personal skills and knowledge system, this context takes account of the individual student's unique cognitive and emotional processes related to their learning and experiences in the classroom environment. This includes their prior knowledge, their achievement history and their gender. In Studies 17 and 18, experience sampling was attempting to "tap into" this system.

The Physical Context

In Studies 17 and 18, classroom layout appeared to be relevant during activities. For example in Study 17, the instructions for the many tasks that children were required to complete were pinned to a large notice board. When children were trying to read these instructions, they were often in

very close proximity to other children, which in turn afforded more social interactions than may have been helpful. In Study 18 the class of over 31 children was required to sit in three large groups of ten or more children – similar to a long dinner table at a wedding reception. When sitting down, each child's chair was often in physical contact with the back of the chair of the child behind her, which was confining. Classroom layout or maps will be included in the reports of emotional geography as relevant, during the discussion of specific sessions.

The five events of ESM sampling in Study 17 (Table 6.4) are briefly summarised below.

Study 17, Day 4

The first occasion of ESM using mood slips took place at 11.14am on Day 4 (Table 6.2). At the time of the trial sampling, the whole class had been engaged in silent reading for the previous 20 minutes. The teacher had told them to put their books away in readiness for their science topic next. Following the explanation of the ESM procedure, the mood slips were passed around. The children were all seated at their desks for this event, which means that the physical context at the time of ESM sampling included not only the where the children were sitting, but also the children they were sitting next to. Therefore each child's emotion words were circled from her/his own location/s according to the following classroom map (Figure 6.2). As explained above, the classroom geography was an important variable for this classroom study, because the children needed access to both the notice board and the book table.

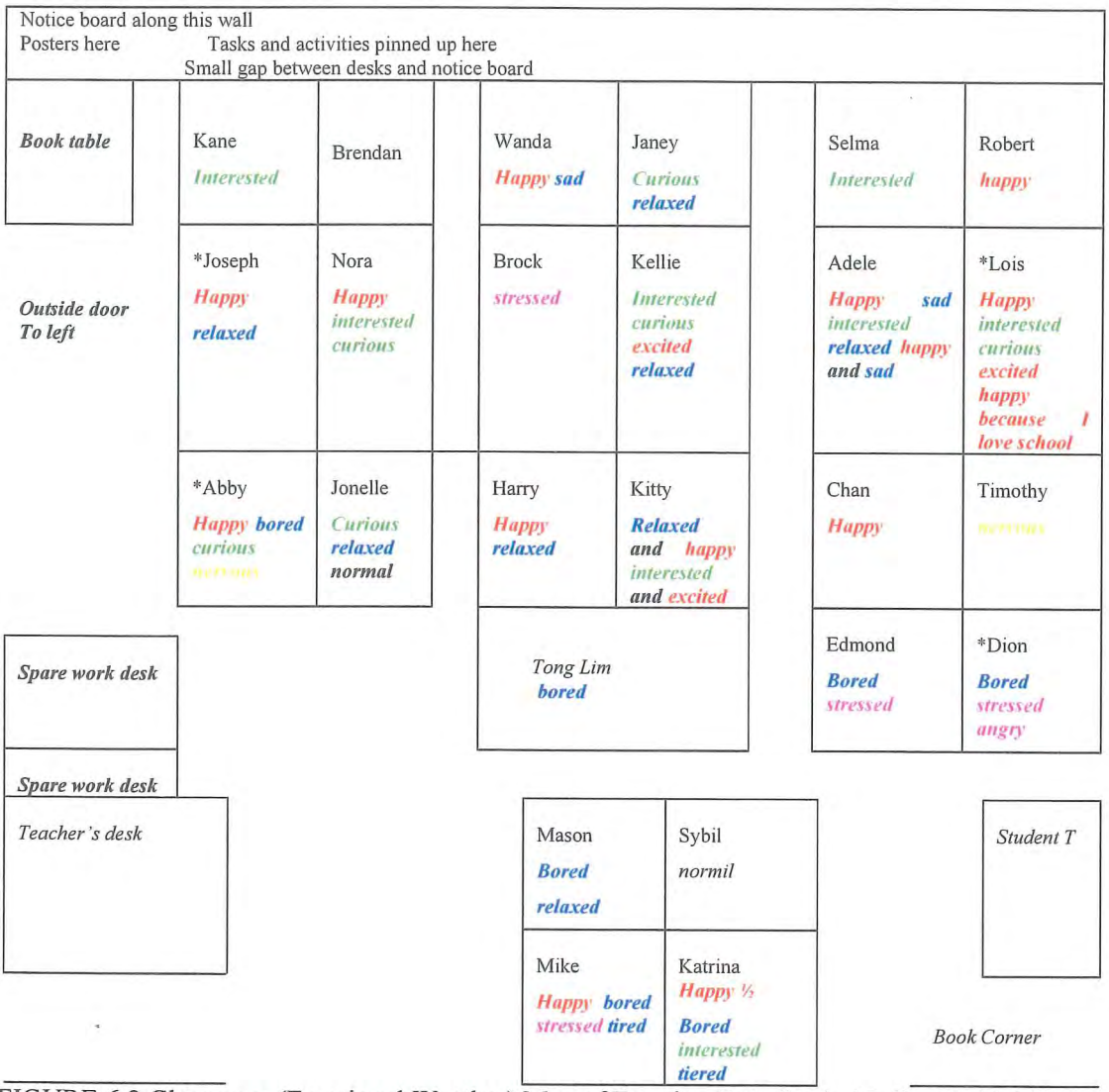

FIGURE 6.2:Classroom (Emotional Weather) Map of Emotion Data Study 17, Day 4, 11.14am
*The four specific subjects or target children of the Project on Learning

The classroom maps may also be referred to as the "emotional weather" maps, reflecting the notion of emotional climate (De Rivera, 1992). Like the weather, this emotion map can change moment by moment, or it may persist. The instructions for the tasks and activities were pinned on the notice board along the wall as shown in Figure 6.2. For the duration of Study 17, Joseph and Abby had their desks next to each other at the first set of desks near the notice board and the book table. Lois and Dion were seated across the room further away from the notice board and separated from each other by one desk. At the time of circulating the mood slips, the classroom atmosphere or climate seemed quite relaxed. To the casual observer, the children had appeared to be engaged in their reading. However, the emotion data obtained from this first trial (Figure 6.2)

demonstrated that while the children had appeared to be relaxed and cheerful, a wide range of positive or negative emotions was reported. For example, four children reported stressed, which was not obvious when viewing the whole class.

Lois and Kellie - with PAT Maths scores of 96 and 99 respectively, were the only children in the class to circle all three Factor 2 emotions, and happy (Figure 6.2). Joseph circled both curious and excited and Abby circled curious. Dion was one of four boys who circled stressed, one of two boys circling bored and the only child circling angry.

The children were not asked to explain their emotions although occasionally a child might describe differences in intensity, such as Katrina's measure of "happy ½" (Figure 6.2). Katrina was also feeling "tiered" (sic) which meant "tired" having written this in her own words. Sybil decided she was feeling "normil" (sic. normal) which she had written in the space below, which other children over the studies also occasionally reported. Some children reported apparently contradictory emotions such as "bored and interested", or "happy and sad". As reported in the statistical analyses, some of these emotion blends and ambivalent reports were statistically significant. Children's appraisals as to the causes of their emotions were not requested or necessarily identifiable. On this occasion Lois was the only child to give her reason, which was "because I love school" (Table 6.2 & Figure 6.2). As well as occasionally including their reasons on the mood slips, children sometimes explained their reasons verbally to the researchers at the time. The interview process was still generally necessary to elicit this information.

The physical context or classroom layout afforded both helpful and unhelpful social interactions on a daily and momentary basis. For example, sitting next to another child introduces a whole new set of adaptational encounters (Lazarus, 1991). There were many examples of the wide variations in adaptational encounters and coping strategies (Lazarus, 1991) required by different children, in the social interactions and events surrounding this first ESM sampling. For example, prior to the session, the teacher had asked the whole class whether anyone had seen Timothy's (next to Dion, Figure 6.2) Ritalin. Timothy's mother had also been in looking for it and was just leaving the room. During interview, Dion explained that he finds Timothy "annoying" to sit next to. Dion also explained that Timothy had been hitting him over the head with a rolled up paper immediately prior to the trial mood probe. Dion circled angry, bored and stressed. He had been talking to Edmond who also circled stressed. Immediately after completing the mood slip, Dion said, "man I'm tired" and was making funny noises into the microphone. Timothy continued to be

active, fiddling with his ruler and leaning over to take a pencil off Chan's desk (opposite him). Lois (next to Timothy, Figure 6.2) spoke sternly to Timothy, "please don't".

In contrast, although Abby and Joseph were sitting next to each other, Abby was ignored and totally excluded from any conversation while those around her were chatting and thinking aloud about their emotions. As noted in the methodology chapter, Nora had asked if they could circle more than one word and was saying to the others, "I'm feeling curious about...". Abby just sat passively watching the others and was fiddling with her hair once she had completed her mood slip. Both Nora and Joseph chose happy as one option while Nora, Jonelle and Abby all chose curious as one option.

In further contrast, Kellie and Kitty in the middle set of desks (Figure 6.2) circled similar emotions to each other. Although they were not special friends as such, they were both good-natured girls who would be comfortable to sit next to. They had both been target children in Study 15, and had experienced two individual video-cued interviews about their emotions. Coincidentally during their interviews they had both expressed their desire to "get an education". On Day 4, the emotions they circled were similar to each other and consistent with their previous interview data.

It is important to realise however that the ESM data have recorded the children's emotions only as at that particular moment in time. Emotions ebb and flow throughout a session. For example, once a child is sitting next to someone else, or when something different is happening, emotions might change. For example, after the ESM data collection on Day 4, the children were called down to the mat for a whole class instruction time about Earth's relationship with both the sun and the moon. The teacher included two demonstrations with children taking part. Using torches and the globe of the world, the first demonstration was about the way light falls on Earth depending on time of day and seasons of the year. In the second demonstration three children took the roles of the sun, the moon and the earth and followed instructions from the rest of the class about rotating on their own axes and rotating around the "sun". With children spinning round on their own axes and then one child attempting to move elliptically around another child and so on, this was very entertaining and lots of laughter ensued. During their video-cued interviews, the target children retrospectively reported their emotions during this event - 20 minutes later. Lois, Joseph and Abby expressed similar emotions as during ESM. Dion was the exception saying that he recalled feeling "cool, happee (sic)" during these demonstrations. Dion

had moved away from Timothy and sat next to Robert on the mat. Subsequent analysis of Dion's specific concept learning suggests that he did learn something new during these demonstrations. He learnt why it gets dark at night. On the pre-test, Dion had answered this question as, "so we can sleep." In the post-test, he wrote, "because the moon is covering the sun". Had the mood slips been handed round 20 minutes later, Dion may well have circled "happy", thereby demonstrating that he was capable of feeling positive in the classroom. This example has been included not to negate the value of the ESM, but to validate its usefulness in assessing momentary or state emotions.

Study 17, Day 5

On Day 5, the mood slips were passed around after a half-hour unstructured session just before lunch at 12.25pm (Table 6.4). The teacher had been called from the classroom to attend to an emergency relating to another child. The two researchers present in the room were charged with taking care of the class as well as observing. On this occasion, Lois, Abby and Dion all circled happy along with their other choices, while Joseph circled excited and wrote excited fo (sic) lunch (Table 6.2). During his interview Dion explained that he had circled angry because he did not know how to spell hungry, which he eventually wrote in. This has implications for this type of methodology. For example some children do have written vocabulary problems. Although Dion's PAT Vocabulary score of 25 was lower than his PAT Reading Comprehension score, there was no recorded evidence that he did have vocabulary problems. As we shall see in a more detailed analysis in the next chapter, Dion did have problems with written work and needed to check certain vocabulary with other children. He was also being taken through a personalised reading programme with the teacher.

Video-recorded data shows that 10 minutes previously, Dion had asked Lois how many tasks she had done. Lois said, "I've done one, two, three, four". Dion frowned and said "Oh man!" Where Lois had been writing in her book for the fifteen minutes prior to ESM sampling, Dion had been writing for five minutes, and had spent 6.5 minutes engaged in non-content chatting and physical "horseplay" activity with other children nearby.

Contrasting experiences were also recorded for Abby and Joseph on Day 5 (Table 6.2). Joseph had been engaged in various activities including reading the notice board, writing a poem and together with Harry "hassling" Abby. For example he and Harry were looking at Abby's

colouring in saying, "you're not supposed to be doing that!" Abby replied, "I don't care". Joseph then said, "you'll be in trouble!" to which Abby replied "ha ha". In addition to these interactions, when Brendan passed by Abby's desk at 12.23pm, he flicked her with his hand. Abby told him to "get lost". Abby's utterances were inaudible to the observer, and were only picked up by the microphone. From the classroom map (Figure 6.2) Abby's location did not afford her any privacy or protection from bullying. The teacher had no idea that Abby was being bullied, because it was quietly done, and continually done over the full study, with plenty of opportunities because everyone had to walk past her to get to the book table and the notice board. However, despite being bullied by Joseph and Brendan over the preceding two minutes, Abby circled happy, interested, excited, relaxed (Table 6.2). Apart from these negative interactions, Abby had been colouring and decorating her work for the preceding 11.25 minutes. Abby's favourite curriculum topic is Art.

Study 17, Day 7

On Day 7, only nine children including the four target children were sampled. Due to very few children remaining at their desks during this session, the research team was fully occupied with observing their specific target child for the whole session. At the time of ESM the target children were working individually, with the exception of Joseph who was helping Timothy seated at Kane's desk. Kane normally sat next to Joseph (Figure 6.2). This session has been analysed in detail and will be reported more fully in Chapter Nine, when we shall examine the antecedents and consequences of specific emotions for two of the target children over the duration of a single session.

Study 17, Day 8

On Day 8 the children commenced their session by writing up the most interesting fact they had learned about space from the previous afternoon's video. They were seated at their desks to do this, after which they were expected to continue working through their allocated activities. The classroom map for Day 8 is presented in Figure 6.3.

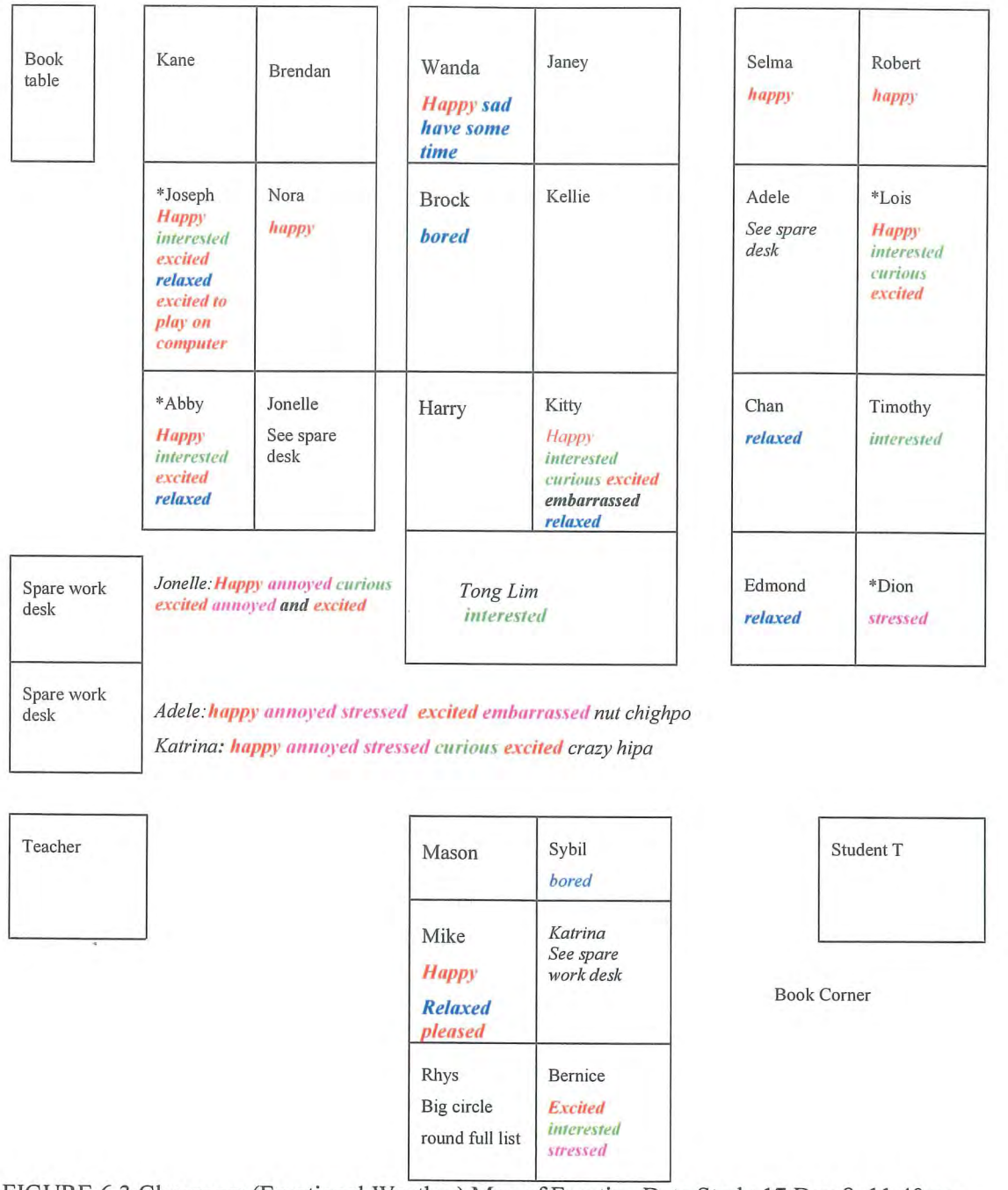

FIGURE 6.3:Classroom (Emotional Weather) Map of Emotion Data Study 17 Day 8, 11.40am
Note: *the Four Target Children of the Project on Learning

During this ESM event, Adele, Jonelle and Katrina were grouped together away from their desks (Figure 6.3). They were highly interactive with each other and in Katrina's words "crazy hipa (sic. hyper)". Adele explained that she was feeling embarrassed from a few days ago because her mother had been in and had a disagreement with the teacher. Lois and Kitty were the only two children circling all three Factor 2 emotions.

Lois did not write her reasons on this occasion. Prior to the ESM sampling, Lois had spent less time than previously writing in her book, and had been conversing with Rhys, and then the teacher. Immediately prior to completing her mood slip, Lois was back at her desk (Figure 6.3) and had just interrupted Timothy and Mike who had been criticising Abby and talking about whose car she had gone in to the observatory visit the previous evening. In an almost aberration compared to her previously focused attitude, Lois asked them, "ooooo, what did you do?" A moment later she told Timothy to "shush". Following ESM sampling, Lois was actually off-task and wandered around the room (also untypical) initiating conversations with other children – even including Timothy and Dion, about the size and shapes of their mandibles (jaw bones). The previous evening Lois had watched a medical documentary about the non-symmetry of every human mandible. Lois intends to be surgeon when she grows up, so this topic was personally relevant to her. (Incidentally, Lois watches minimal television as she has so many extra-curricular activities, including School Certificate Level (Fifth Form) Science.) Once Lois had finished her own classroom research on children's jaws, Timothy tried to engage her in further conversation, but she totally ignored him.

Dion had been at his desk and chatting with people round him about black holes and their visit to the observatory. They had been arguing about black holes, and Dion said, "I read it in a book". This was going on while he continued to colour his picture about his most interesting fact, which that "Saturn's rings are made of ice dust and rocks". Just after handing the mood slip across, he frowned and like Lois also asked Timothy to "keep quiet". He continued to colour in for 2.5 minutes before spending 3 minutes arranging his fact on the notice board.

Joseph had once again been criticising Abby, with more personal remarks on this occasion. Earlier in the session, he accused Abby of "stealing" blue tack off the notice board, and then talked about it loudly with Nora in front of Abby. This was prior to Abby and Nora spending time at the computer. Abby had replied, "none of your business". Joseph had been engaged in the solar system task that required colouring in of all the planets, cutting them out and then pasting them in the correct order from the sun onto black cardboard. At the time of ESM sampling, Joseph had been also engaging in silly talk, saying things backwards and going up to other children saying, "I love you". Very little of Joseph's activities that morning had related to the topic. Abby had also been engaged in the planet activity, once again working in isolation and dealing with the verbal abuse from Joseph. At the time of filling out her mood slip she had been sitting at the computer with Nora for the previous 7 minutes and had only just been given control of the mouse. Forty-

five seconds later Nora took the mouse back and retained control for the next 8 minutes until their rostered time was up. Although Abby had only held the mouse for 45 seconds she said that Nora was helpful. As noted at the commencement of this chapter, Abby feels happy "when someone is helping me". As we have also seen since, this is a rare event in Abby's school life.

Study 17, Day 9

Day 9 was the final day of the unit on Space. During this session the whole class was engaged in the same activity. First, they were given a work sheet to complete individually. This work sheet listed 15 items necessary for landing on the moon, and the children were asked to rank these in order of priority for survival, should they accidentally land 200kms from their rendezvous point. After 10 minutes, the teacher then assigned the children to groups to share their individual answers and to reach a group consensus about the priority list. The mood slips were passed around approximately 10 minutes into this group activity. Subsequent to the group activity, the whole class assembled on the mat for a whole-class discussion on the same list, with whole class consensus being attempted as to the prioritising.

Having been assigned their groups, the two groups with Dion and Lois remained indoors, while the two groups with Abby and Joseph went outside. Abby's group sat in the sun on the bench just outside the classroom, while Joseph's group wandered around eventually settling on the outside picnic table. The groups including the four target children and their individual emotions circled are listed below:

Dion	**stressed**
Nora	**annoyed stressed**
Kitty	**happy annoyed relaxed**
Kane	**annoyed**
Lois	**happy interested curious excited**
Adele	**happy sad stressed curious**
Chan	**happy** ***happy***
Tong Lim	**interested** ***interested***
Joseph	**happy interested relaxed**
Timothy	***curious***
Selma	**happy interested stressed excited**
Katrina	**happy stressed bored interested excited** *crazy sico*
Katrina 2	**happy bored** (because the work we are doing) **annoyed** (because we lost the netball) *2nd form filled out by her at her request, this day had several incidents of interaction with T about being bored*

Abby	**happy interested excited relaxed** *fine*
Harry	**interested** *fine*
Kellie	**happy interested**
Brendan	**happy bored embarrassed** *fine*

Each group of children demonstrated a within-group consistency. For example, three of the four children in Dion's group circled annoyed, as well as two circling stressed. While Dion had consistently circled stressed over four occasions of ESM sampling, Nora had circled stressed only once before. Kitty had not reported annoyed on any previous occasions she was sampled, and Kane had only circled positive emotions when sampled on two previous occasions. The observation data confirmed that this group of children was having trouble coming to a consensus and they were arguing more than they were agreeing. Dion came over to me during the observation, gave me his mood slip and explained why he was stressed and what that felt like.

Lois was in charge of her group and after attempting to get ideas from the others in the group she wrote her own answers for Item 9 and onwards. Once again Lois was the only child to circle all three Factor 2 emotions. Ten minutes before ESM sampling, as the groups were collecting Joseph made a negative comment to Abby, and Abby's facial expression appeared to be annoyed in response. Although Brendan and Harry were in the same group with Abby, on this occasion there was no evidence of bullying from them. When Abby handed back her mood slip, she said, "I'm feeling fine", which Harry and Brendan overheard and they also wrote *fine* down on their mood slips.

When Joseph's group was handed their mood slips Katrina and Selma verbally "rattled off" their different feelings while they looked at the list, and they had reasons for every choice. Katrina was loudly vocal about being "hyper" and being bored. She was annoyed because they had lost the netball tournament the day before. The teacher happened to come along at precisely the time Katrina said, "bored". The teacher asked, "What have you got to be bored about?" Katrina said that the task was boring. Katrina then sought me out and asked if she could fill out another form. I said yes but put No. 2 on it. She filled out a second form explaining why she felt bored and annoyed. These reasons are recorded in the list above.

Within a few minutes I was back in the classroom and Dion handed me his mood slip saying, "I put stressed". I asked him what did he mean by stressed. Dion explained: "It's like everything is in there (pointing to a point in the middle of his forehead) and I can't get the right things out of

my head". As he was giving his explanation about what stressed feels like, the teacher passed by again, overheard this and said to a different observer "he worries me that boy".

During the final mat session of group feedback 25 minutes later, Katrina was sitting at the teacher's feet. She said, "This is boring!" (12.12pm). The teacher said to Katrina, "I'm not going to put up with your stupid nonsense" in a very loud voice. This was the third time that this teacher had spoken to the same child over the same issue. As well as her earlier response when Katrina was talking to me (above), on a previous occasion the teacher had also heard Katrina say she was bored, and she spoke to Katrina from across the classroom.

Concept Learning on Day 9

The prioritising task on Day 9 was relevant to Item 32 on the pre-test, which was as follows:

Item 32: Sally and Tom and Jenny and Mike were talking about living on the moon. They were talking about the most important thing you would need to live there.

Sally said warm clothes.
Tom said air that you could breathe.
Jenny said a map to know where you were.
Mike said fresh food that you could eat.

(a) Which one do you think was right? _____
(b) Which other one do you think might be right? _____

The correct answer for (a) was Tom, and for (b) was Sally or Mike. For (a), 21 of the 24 cildren in the class (including Lois, Dion and Joseph) gave the correct answer in the pre-test. Abby did not get this correct in the pre-test, and appeared to have learnt this item in the meantime demonstrated by her correct answer in the post-test. Apart from Mason, everyone else answered (a) correctly on the post-test.

For the second answer (b), 20 of the 24 cildren (including Lois, Dion and Joseph) in the class got this correct in the pre-test. Both Lois and Abby got this correct on the post-test, but five children originally answering this item correctly on the pre-test, answered it *incorrectly* on the post-test. This included Dion and Kitty (who had been together in the same group), Joseph and Timothy (also together), and Adele (who was in Lois's group). These three children had all answered that Jenny was correct, indicating that they thought that the map was more important than warm clothes or fresh food, in a moon-landing emergency.

This mis-learning or un-learning might be due to a variety of reasons. First, most of the items the children had prioritised in the series of classroom activities on Day 9 were not included as options in the post-test. The options on the group activity sheet had not specifically included warm clothes or fresh food. Options on the activity sheet had included such things as flares, box of matches, food concentrate and a solar powered radio transmitter. Dion's group's sheet had lots of crossings out and evidence of re-sequencing their items, apart from their apparent agreement without argument (evidenced by no crossing out) that oxygen was the first priority (Appendix 11, p. 494). Abby's group had also changed their minds on some priorities (Appendix, 11, p. 497), whereas both Lois's and Joseph's group sheets had no crossings out (Appendix 11, pp. 495-496). Second, the activity itself might have confused their existing knowledge of the four basic essentials for survival. Third, the activity itself was associated with negative emotions for both Dion and Kitty. Although Joseph had circled happy, interested and relaxed, and Timothy had circled curious, when they had been engaged in the activity together, there had been a lot of other activity going on as well, including Katrina's "hyper" chatting with Selma. Adele had included stressed in her ambivalent "mix". However, these associations between an incorrect answer for Item 32 (b) and negative emotions reported do not necessarily demonstrate cause and effect. The testing process itself may also be associated with emotions or lack of attention at the time of completing that task. Finally, the overall result for this item might also reflect the fact that it was well known already by most of the class. Interview data from 24 subjects across six of the classroom studies in the Project on Learning, including the four target children from this study, indicate that repeating material that children already know is boring, which may also lead to feeling annoyed and stressed, and does not help their learning. At the time of ESM data collection, the children had already been over the same prioritising task twice.

Expectations versus Outcomes

Before we conclude this section on the Study 17 target children, their overall expectations have been compared to their overall retrospective summaries of their experience. In the pre-test, they were asked, "Do you think you'll find this topic on Space –stars and planets and rockets and things: very interesting, a little bit interesting, a little bit boring or very boring? In the post-test they were asked the same question, worded, "Did you find..?" The target children's pre and post-test responses are set out below:

	Expectations	Outcomes
Lois:	very interesting	very interesting
Joseph:	a little bit interesting	very interesting
Abby:	very interesting	very interesting
Dion:	very interesting	very interesting

From these responses, each target child's expectations were met, with Joseph finding that the topic exceeded his expectations.

Results so Far

These findings have briefly provided contexts for the four target children's overall emotion data as reported in the ESM results. Lois was the only target child consistently reporting the three Factor 2 emotions, and she also had a high PAT Maths score. From the ESM and contextual data we have not found any specific event of Lois learning a specific pre- or post-test item. As noted earlier, she knew most of it anyway. However, Lois retained her correct answer for Item 32 – despite the Day 9 session being repetitive and potentially confusing. On Days 5, 7 and 8, at the times of ESM sampling Lois had been engaged in her preferred activity of finding new facts. Day 8's content at the time of ESM sampling may not have related to Space Topic, but to her future goal of being a surgeon.

Similarly, Abby had circled some of the Factor 2 emotions, despite being verbally and physically bullied. During some ESM events she had been engaged in her preferred activities. For example on Day 7 she was doing her word find, and on Day 5, she had been drawing and colouring in. Despite being bullied and hassled, Abby reported positive emotions during these activities. Abby also demonstrated new learning for Item 32, this content being associated with the activities on Day 9.

Joseph had circled interested on Days 7, 8 and 9, none of which occasions were associated with new learning. Evidence presented so far from Days 5, 8 and 9 show that Joseph's positive emotions were reported during or close to times of verbally abusing Abby. His other main emotions were either relaxed or happy, and excited when he had a specific event to look forward to, such as lunch or the computer.

Dion's ESM data were obtained during events associated with stress. For example, he had been coping with Timothy on Day 4, and arguing on Days 8 and 9. On Day 5 he appeared to be disheartened by hearing how many tasks Lois had completed, and the events surrounding his stress on Day 7, have yet to be presented. On Day 8, Dion was still colouring in his most interesting fact about Saturn's rings, when he circled stressed during the argument about black holes. This was 20 minutes after the start of the session, indicating that instead of taking only five minutes as instructed at the start of the session to finish this task, Dion took much longer. However, he would have been paying some attention to this new and interesting fact through his colouring in, although it was concurrent with the argument. Including the example of Dion's more positive emotions during a different event on Day 4, indicates that while Dion might appear to demonstrate a "stressed" trait, when the context was more conducive, he was quite capable of feeling "cool, happeee". We have seen that happy is not directly related to learning, but it was related to the Factor 2 learning oriented emotions. Dion's definition of "cool" will be explored later. Both the Day 8 example and the Day 4 mat event did appear to relate to his learning of two new concepts.

Based on the ESM data and the internal consistency of the four target children's reports, we might be tempted to assume that these were the children's emotional traits. However having examined the environmental data surrounding the five ESM events, we can see consistencies in the environment itself. For example, ESM happened to capture similar types of events each time. The contextual data is more consistent with Lazarus's (1991) argument that these patterns of recurrences of certain emotions more accurately reflect the children's responses to their recurring environments.

We can also see that each child's individual environment was unique, depending on the children they were engaged with and the activities they are engaged in. There is a suggestion also that their enjoyment of the activities might reflect their preference for certain academic domains. For example, Abby's enjoyment of art might have outweighed potentially negative emotions in response to being verbally and physically bullied during class. This is not to excuse the bullying but might reflect a useful coping strategy. The other environmental evidence including her successful learning suggests that maybe her positive emotion reports were accurate despite all the evidence pointing to her existence as being anything but positive.

Emotional contagion (Jenkins & Oatley, 1998) was also evident, particularly at the time of the group activity on Day 9. The overall atmosphere once the children had been sorted into groups, was hectic. The teacher was rushing between groups as evidenced by her appearance at Joseph's group outside where she first spoke in response to Katrina's boredom, and shortly after being near Dion's group inside to overhear his description of stress. The teacher actually jokingly reported feeling stressed the day before on Day 8, when the class was also similarly hectic with Katrina's group feeling "hyper and psycho" in the middle of the classroom (Figure 6.3). In passing, the teacher had said to me that she would circle stressed on the mood slip if she had been given one. This would not surprise Cathy (Study 14, above) who had said that teachers get stressed in response to children's noise. In contrast, the Day 4 mat time demonstrations were entertaining rather than stressful. For this event, the children were "corralled" on the mat and their attention was more specifically focused. Rather than emanating stress on that occasion, the teacher and the children were being entertaining and entertained.

Within-group emotional contagion was also evident on Day 9. For example, while Dion had circled stressed as an individual experience on previous days, he reported stressed in a group situation on Day 9. This stress appeared to be contagious as was annoyed, with previously positive girls also now reporting negative emotions. Lois had the reverse effect on her group. Anecdotally, children like to work with Lois because she knows so much and they will get things right. Therefore the cildren in her group could relax, especially as she took over, as they gradually became more passive under her leadership. Katrina and her friends hyped each other up on at least Days 8 and 9. Kellie's presence in Abby's Day 9 group - containing two of her main "harassers", appeared to be associated with an absence of bullying for Abby. Based on the evidence presented so far, it would be the exception rather than the rule, to find that Abby was not being bullied when in such close proximity to Harry or Brendan. However, Joseph was elsewhere. Being seated in a row on a sunny outside bench separated from Brendan and Harry by pleasant and knowledgeable Kellie may have provided safe haven for Abby on this occasion. Most of the "group" discussion was conducted between Harry and Kellie who were the academic leaders in this group of four.

Dion's experiences provide the only example so far of socio-cognitive conflict in relation to academic topics. These events of arguments on Day 8 about black holes, and Day 9 about the order of priorities for survival on the moon, indicate that he and those particular children involved did not have the skills to argue and debate towards an amicable consensus or even to agree to

differ. Rather than the argument on Day 9 bringing out good discussion skills, it seems that even the more positive Kitty and Nora were unable to deal with the conflicting ideas without negative emotions being elicited. In contrast, Lois tried to get "her" group to discuss, but she ended up writing the order of priorities in herself, with no argument from the others and no crossings out. In Abby's group, Abby occasionally said, "I put that too" but the main discussion was between Harry and Kellie – both high achievers – who did debate well, with minor contributions from the other two. Relying on children who can be predicted as helping you get the right answer supports the argument that work sheets perpetuate the "mistake stigma" (Herrenkohl, Palincsar, DeWater, & Kawasaki, 1999) (p. 455), despite the efforts by this teacher to extend their cognitive skills through using Blooms Taxonomy across the various tasks.

The context data presented above have explained only a minor proportion of the total time that children spent on Space Topic, let alone in school on any given day. At this stage of the results we have not been able to demonstrate a consistent clear relationship between Factor 2 and learning although some examples have been given.

One further relevant variable is that the children were given the autonomy to choose which tasks they would do, apart from Day 9. Although Lois and Joseph had less choice in the tasks they could undertake, they still had the choice of which tasks to undertake first. The next issue to arise was that choice alone did not guarantee completion of any given task, as demonstrated in the task completion outcomes data (Table 6.1). In order to investigate the environmental contexts, including antecedents, consequences and the emotion components of these ongoing adaptational encounters, their choices have been analysed. In addition, the Day 7 session has been fully analysed using ESM and the video-cued interview data, plus the observational and video/recorded data. These results are presented in Chapter Nine. Although not claiming that they are representative of all classroom populations we have enough statistical support to suggest that the experiences of these four children might be similar for other children with similar profiles and in similar classroom contexts.

In the meantime, I shall now conduct a similar but briefer analysis of the Study 18 subjects, for whom there was more potential to find specific learning events, related to specific emotion reports.

Study 18 – The Aztecs Study

Study 18 was a longer study, for which there is not the scope in my thesis to explore to its fullest potential. For the purposes of my research question, comparable analyses to those above for Study 17 will be addressed similarly, but we will not go through every ESM event.

Study 18 took place over nineteen days within a five-week time frame between October and November 2000. In total there were twenty-two sessions of which ten were held in the mornings and twelve in the afternoons. This was an integrated unit entitled "The Aztecs" incorporating Social Studies and Art. The teacher chose this topic rather than Egypt, because the children had not been previously taught the Aztecs, and it might be a more useful research example of a unit where new concepts would be learned. The first session on Day 1 was essentially a brainstorming session to find out what the children knew about Mexico *today*, but the relevance between Mexico today and the Aztecs of the past was not clearly identified. One child thought the topic was about "as tech's" people (meaning technicians). It actually took until Day 4 for the Aztecs themselves to be introduced, which was done through exploring the concepts of myths and legends. On Day 4, the children were all given a two-sided A4 sheet telling the myth *The Heart of Copil and the Eagle of Tenochtitlan*, which they had to read and then draw an aspect of. The mood slips were introduced on Day 5, when the children were revising their drawing task from the previous day, and preparing to start a worksheet on where the Aztecs lived.

By Day 6, the children were given six research categories from which they were to select one category, within which they would do their own research. On Day 7 the teacher spent 12.75 minutes of the 26.5-minute instruction time revising open and closed questions. This was because the children's research questions needed to include three open questions and three closed questions. From the classroom transcript of the session, it appeared that many children were confused about what they were supposed to be doing with the Aztecs, as well as being confused about open and closed questions. On Day 9, the Art activity was introduced. This required the children to make an authentic Aztec mask out of paper mache on a round dinner-sized disposable plate. Compared to the previous sessions, which had been very structured and teacher-led, this session marked the beginning of a more relaxed series of sessions. Subsequent sessions included research time and paper mache mask making, until the final two sessions where the children had to present their findings in their Aztecs research category.

Children had three areas where they could choose. First, they could select one of the six research categories, second, they could choose their mode of research presentation and third, they could choose which authentic mask they would make. A "by-product" of choosing their specific research category was that they would later be joining up with other children choosing the same category, and together they would agree on their mode of presentation. Needless to say, for many of the children, finding out what category their friends were doing, was the first and most important question of all.

Similar to Study 17, this teacher had also collated a wide range of resources including various worksheets, posters and books. The children had less "free choice" time overall, and tended to access the books at designated times early in the study. Later in the study, children accessed the books as they felt the need. There were four computers in this classroom, which were generally occupied by the boys who searched the net or CD roms as their first port of call when trying to find resources. As Rewa (one of the four target children) explained, "I think it's because all the boys like getting the computer and stuff, (because) like girls aren't really interested in the computer in my class - not as much as the boys."

The Four Target Children Across Time

The four target children for Study 18 were Libby, Rewa, Rod and Ned. Their individual ESM results are reported in Table 6.5.

Table 6.5

Time Series of Four Target Children's Emotions in Study 18

Day/Session	Libby	Rewa	Rod	Ned
Day 5 11.15am (trial)	Tired	Absent	Happy Relaxed	Interested
Day 5 11.57am	Tired			
Day 6 11.48-51am	Bored Confused	Happy		Absent
Day 7 12 noon Research	Bored Interested Tired	Happy Nervous	Happy Interested Stressed Energetic	Bored
Day 8/1 am Research	Happy Curious Relaxed Fun *Okay*	Happy Nervous 11.40am	Interested Tired 11.40	Bored 11.36
Day 8/1 am Research		Happy Interested 11.56am		Hot 11.50am
Day 8/2 pm Research	Annoyed Frustrated Fun	Happy	Annoyed Stressed Angry Frustrated	Curious
Day 9 2.05pm Masks	Happy Energetic Relaxed Fun	Happy	Happy Fun	Fun
Day 10 11.30- 40am Research	Sad Interested Curious Tired	Happy Interested Excited Energetic Relaxed Fun	Happy Stressed	Bored
Day 11/1 am Research	Tired	Happy *Very happy*	Happy	Happy Annoyed Interested Curious Nervous Excited Relaxed Energetic
Day 11/2 pm Masks	Excited	Happy	Happy Fun	Interested
Day 12 am Research	Nervous	Happy Interested Curious Excited Relaxed Tired Anxious Fun	Happy Fun	Interested curious
Day 13/1 am Research	Tired	Happy Interested	Happy Bored	Bored Interested

		Curious Excited Relaxed Tired Energetic Fun	Stressed Fun	Tired
Day 13/2 pm Masks	*Don't feel anything* *Gooey*	Happy	Happy Fun	Happy
Day 14 pm Research	Bored Tired	Happy Interested Curious Excited Relaxed Tired Energetic Fun	Happy annoyed Fun	Happy Bored Interested Excited
Day 15/1 am Research	Annoyed Tired	Happy Interested Curious Relaxed Tired Fun	Happy Interested Relaxed Fun	Interested Excited 11.31am
Day 15/1 am Research				Interested Excited 12 noon
Day 15 / 2 pm Masks	Annoyed	Happy Excited	Happy Fun	Happy Interested
Day 16 am Research	Bored Annoyed Tired *Bored* *Tired* *Annoyed*	Happy Interested Curious Excited Relaxed Tired Energetic Fun	Happy Fun	Happy Interested Excited Nervous
Day 18 am Masks	*Nothing*	Happy	Happy	Excited
Day 19 am Masks	Annoyed	Happy Excited	Happy Fun	Absent

Due to the variable timetable in Study 18, ESM data were obtained both mornings and afternoons, sometimes of the same day (Table 6.5). For example, on Days 8, 11, 13 and 15, both morning and afternoon data were obtained. On occasion, an individual target child was given a second mood slip during the session, usually because I was her or his observer at the time, and it would be interesting to see if their initial emotions circled were sustained or whether they would be different. For example, on Day 8/1 Rewa moved from reporting happy and nervous to reporting happy and interested. Ned moved from bored to hot (Table 6.5).

Between-Subjects Comparisons

Between-subjects we can see that there were fewer similarities than differences in the reported experience of the four target children on most occasions sampled (Table 6.5). For example, on Day 9, the first session of paper mache mask making, the four children were the most similar, with Libby, Rewa and Rod circling happy, and Libby, Rod and Ned circling fun. On Day 7, the first research session, Libby and Ned both circled bored, while Rewa and Rod both circled happy. On this occasion also, Libby also circled interested and tired, Rewa also circled nervous and Rod also circled interested, stressed and energetic. The Day 7 ESM data were collected after the class had started working on their own after the 26.5-minute instruction phase referred to above. Despite the purpose of this session being for children to generate some interesting research questions, only two of the target children circled interested. Having spent 26.5 minutes sitting at their desks, the class was instructed to think on their own - and not talk to anyone else – in order to come up with three open and three closed questions about their research topic.

Ned wanted to talk about warfare with Dexter, but was told to stay put, so he was bored. Rod was interested in the warfare topic, but was stressed because he did not know whether one of his questions was open or closed. He had his hand up for 1 minute 30 seconds, and when the teacher came over he asked her. She then turned the question back to him asking, "what do you think?" Rod explained during his interview that he was stressed, "cos I wouldn't have asked her if I'd known cos if I had known, I would've put it under what I thought it would be". He was happy "just like normal happy", and energetic because he was "just energetic". In contrast, Libby said that she "just circled any" emotion words, yet her rare event of circling interested was consistent with her observed animation in talking with Jodie and Kirsty (against instructions) on Day 7, and in contrast to most other occasions sampled. These three girls were focused on their topic of temples and sacrifices for 87% of the activity time on Day 7, compared to 28% for Rod, 29% for Rewa, and 16% for Ned. Rewa was happy, and nervous about speeches coming up later that day. Rewa had been receiving assistance from the teacher around the time she filled out her mood slip on Day 7, and wrote her questions about Aztec markets after the teacher had made suggestions. Later in the week, Rewa changed her topic.

Rod and Libby circled interested on three and two occasions respectively during the earlier sessions in the study (Table 6.5). In contrast, Rewa and Ned circled interested on more occasions at a higher rate later in the study. Rewa circled interested on seven occasions, while Ned did so on

nine occasions. The timing of these frequencies was coincidental with Rod and Libby being able to get onto and finishing their research topics sooner than Ned and Rewa who had not finally decided what they would do until Day 11/1. Libby and Ned circled bored on four and five occasions respectively, while Rod and Rewa did not circle bored at all.

Day 15/1 was the only occasion when more than two of the target children circled interested during the same event (Table 6.7). On that occasion, after a six-minute whole class instruction phase, the class was working on their research. Rewa had been reading the symbols around the circumference of the actual Aztec Calendar that Elle had brought in from home. Rewa circled the Factor 2 emotions of interested and curious (Table 6.7). Rod had finished his (officially his group's) hyperstack, and went outside to join Denzil and Jack who were painting the cardboard model of a WW2 tank that they had made. He said to them, "it's a real army tank colour". Rod circled interested, relaxed, fun and happy (Table 6.7). While Rod had been doing most of the work on the hyperstack, Denzil and Jack made this tank as part of their presentation on Aztec warfare. This indicated that despite the timeline activity earlier in the topic, these two boys did not realise that the Aztecs wars were not 20th century wars. (The teacher did question them about the authenticity of the model as she went past.) At the time of ESM sampling on Day 15/1, Ned had been contributing and writing on his poster. He circled the Factor 2 emotions of interested and excited (Table 6.7). Ned was also feeling the same emotions at noon, when I asked him to fill out another form. Compared to when she reported interested on Day 7, Libby and her friends were no longer talking about sacrifices on Day 15/1. They had basically completed their research and were writing it up on their poster. At time of ESM sampling on Day 15/1, Libby had been talking about television programmes and was watching Kirsty write on their poster. Libby circled annoyed and tired. Libby's rate of annoyed increased to four out of the last five sessions sampled. This coincided with completing all her tasks. Both Libby and Rod circled annoyed on Day 8/2. Ned circled annoyed only on Day 11/1.

Comparing the between-subjects overall data, it seems that each event sampled was not equally enjoyable for the four target children, apart from the first session of making masks on Day 9, or the specific research session on Day 15/1, although on this occasion Libby reported annoyed and tired.

Within-Subjects Comparisons

Rewa was the only target child to report all three Factor 2 emotions of interested, curious and excited on more than one occasion (Days 12, 13/1, 14 & 16) (Table 6.5). Rewa also reported happy on every occasion, irrespective of whether she was feeling nervous (Days 7 & 8/1), or anxious (Day 14). In response to the question of why was she happy, Rewa said, "I don't know, I'm usually happy". Apart from two occasions of circling nervous, "because we had speeches that day and I was nervous about that", and one of circling anxious, Rewa's reported emotions were mainly positive throughout the full study. Rewa said that when she had circled anxious on Day 14/2, she was mainly curious and interested, so she possibly misinterpreted the word on that occasion. On Day 9, as well as enjoying the mask activity, Rewa also circled relaxed, "cause um I think I'd just done my speech and I felt relaxed and stuff". Rewa worked with Elle. Originally Rewa had chosen to research markets, but she changed her mind and went round the other girls on Day 11 eventually being accepted by Elle to work with her. On Day 11 she made a point of indicating that she was "very happy", by circling the word three times. They chose to study Aztec Time especially the Aztec calendar. Once she started working with Elle, Rewa started to circle the Factor 2 emotions, as also did Elle.

Although Ned circled bored more frequently than the other target children, he also circled interested the most frequently, sometimes circling both on the same occasion (Days 13/1 & 14) (Table 6.5). On these two occasions, Ned explained that he was interested in the research category of warfare, but bored with doing the poster preparation. The decision to do his research presentation as a poster was made after the ESM event on Day 11/1. ESM data from Day 11/1 shows that this was the single occasion Ned had circled annoyed, as well as nervous, energetic and a mix of positive and negative emotions including all three Factor 2 emotions. This session was a watershed experience for Ned. The teacher had instructed the class to decide whom they would work with, and how they would present their research. Ned's group began planning a vigorously authentic role-play on sacrificing. Ned wanted to be a priest, but another child said that priests were slim (Ned was not slim), so Ned decided he would be a "chunky priest". They also decided that perhaps the non-English-speaking boy, whom the teacher brought over and asked for them to include, would play the role of a cactus. However, they were having trouble reaching agreement on anything and later decided that they might use this child as the sacrifice. The group eventually decided it was not going to work so Ned and Dexter decided to work together on a poster. Ned circled annoyed because he felt "a bit annoyed (because) I really

wanted to do that role play". At the time of circling his words – including the three Factor 2 emotions, during that ESM event on Day 11/1, Ned had just contributed his ideas and was actively involved in the discussion. During the later sessions when Ned circled interested and bored, he was interested in the topic but bored with the poster method. Ned's attributions about his ambivalence were consistent with Lazarus (1991) and Oatley and Johnson-Laird (1998).

By Day 16, Ned circled nervous and excited, because the presentation day was looming, and both he and Dexter knew they were not as well prepared as they should have been. This report of excited associated with nervousness might be a rare example (for this sample) of excited being associated with a general context of upset or nervousness, consistent with Lazarus (1991).

Rod had his ups and downs in the emotion words chosen (Table 6.7). Over the full duration of the study he reported solely Factor 1 emotions on Day 8/2, and ambivalent experiences on several occasions, including stressed and happy on Days 7, 10, and 13/1. Recall that Rod had suggested that stressed would be one of the most "popular" emotions (Chapter Four). Following that up, I asked him, "What sorts of things would make you stressed?' Rod replied, "Well like having to do work that takes ages to do like you can't get it finished, and you're bored. You can't get it finished on time." In conjunction with stressed, Rod also circled interested and energetic on Day 7, and also circled bored and fun on Day 13/1. Rod's ambivalent and negative emotions were experienced during the research sessions, reflecting his concern about getting his questions right on Day 7, and his role in the group of three boys, latterly.

Rod was the academic leader in his group, and took the main responsibility for their group task. They had decided on Hyperstack using Hyperstudio and were making an animation of Aztec warfare. They were also including their own voices and other sound effects. However, Rod was frequently left to continue on his own while Jack and Denzil appeared to get distracted. Rod and the rest of the class were aware of his computer skills and he was regarded as the most competent on the computer. This might have been a factor in the others leaving him to it. Other children sometimes called him a "braniac" which he found annoying, and in these group tasks he was also feeling annoyed and stressed about whether it would all be done in time. Rod's report of relaxed when his hyperstack work was completed on Day 15/1, is consistent with having finished the task, and no further reason to feel stressed.

Libby was the most low-key during this Aztecs Study. She was bored and annoyed more frequently than she was interested or curious or both. The only occasion that she combined two of the Factor 2 emotions was on Day 10. During this occasion, Libby, Kirsty and Jodie were getting bored with the research. They had been focused early on and basically obtained all their information early on. As Libby explained about Day 10:

> Well what happened - we were really bored and we had to think up another open question so we thought up one. What were the different ways of sacrificing? And then Carly told us that this book was really good so we took the book right? And then someone had to use the book so we were sitting there really bored so we decided to make up a poem (Libby, Study 18).

They were apparently pleased with their poem as they took it up to the teacher and read it to her. The teacher then called for attention from the whole class and asked the girls to read it out again. The laughter and applause in response demonstrated everyone's appreciation of the poem. On some occasions, Libby's words circled were based on her conversations during the activities. For example she put annoyed on one occasion because she and Kirsty had been talking about how someone had "wrecked our play" earlier in the year, so they remembered the event and felt annoyed again. Libby circled nervous on Day 12, because she was concerned about what Kirsty would say about the way she underlined the heading on their poster.

Libby also explained to me during interview that she felt annoyed about actually doing the mood slips after a while, "because I kind of get sick of it. Don't go keep on doing that". There was only one other example of this sort of negative response to the mood slips. When Jed and Jeff were interrupted in practising their speech for the presentations they both circled annoyed. I asked what they were annoyed about and they both said "you interrupting us". I thanked them and apologised and said I needed to know that sort of thing. To me it was affirming of the process that they could say that to me. These examples were similar to the reactivity issue identified by Rathunde (1993).

Summing up the between- and within-subjects qualitative findings for Study 18, it appears that the different emotions circled reflect the environmental conditions at the time of ESM sampling. Recall that there were no significant differences between the classrooms apart from Study 17 having a higher rate of stressed and embarrassed. So far it appears that these qualitative findings from Study 18, also support the role of the context differences in the emotions circled during ESM sampling. The words circled generally appear to reflect different state or momentary responses to variables uniquely significant to the individual children at the time of sampling. The

next sections will profile the four target children from Study 18 in relation to gender, achievement and concept learning.

Profiles Relating to Achievement, Gender and Concept Learning

The four target children's PAT Maths and Comprehension achievement and percentiles for emotion Factors 1 and 2 are reported in Table 6.6.

Table 6.6

PAT Maths and Comprehension Scores and Emotion Factor Percentiles (Study 18)

	PAT Score		Emotion Factor Percentile	
Subject	Maths	Comprehension	Factor 1	Factor 2
Libby	25	69	59.02	31.15
Rewa	24	70	19.67	72.13
Ned	95	54	49.18	72.13
Rod	n/a	99	50.82	21.13

Libby with the second-lowest PAT Maths score of 25, was in the highest percentile for the negative cluster of emotions in Factor 1, and in the second lowest percentile for Factor 2 – interested, curious and excited (Table 6.6). Rewa's PAT Maths score was almost identical (25), yet she reported a higher rate of Factor 2 emotions - in the 72.13th percentile, and was in the lowest percentile for Factor 1 emotions. Ned as a high PAT Maths achiever was also in the 72.13th percentile, while also in the mid-percentile range for Factor 1. Rod's PAT Maths score was not provided and may not have been done. However anecdotal evidence was that Rod was the highest achieving boy in maths, and during the time frame of Study 18, he sat a special external examination for maths. Maths was his favourite subject.

Rod was in a higher percentile for Factor 1 negative emotions than for Factor 2. Looking at just the two boys, neither Ned nor Rod was consistent with the almost statistically significant negative relationship between Factor 1 and PAT Comprehension scores for boys. Rod with the highest PAT Comprehension score circled Factor 1 emotions as frequently as Ned did, despite Ned's lower PAT Comprehension score. Comparing Ned with Dion from Study 17 (Table 6.5), they had very similar PAT Comprehension scores of 54 and 52 respectively. However, Dion has reported a higher rate of Factor 1 emotions compared to Ned. While the relationship between Factor 1

emotions and PAT Comprehension did not quite reach significance, comprehension skills may be relevant in how well an individual child interpreted written task requirements.

Ned as a higher-achieving maths child has reported the highest frequency of Factor 2 emotions, therefore being an example of the finding that children with high Maths PAT tended to score higher in Factor 2 emotions. Rewa – as a lower achiever in maths has scored in the same percentile for Factor 2, as one example of girls tending to report higher frequencies of Factor 2 emotions compared to boys. In comparison Libby has reported a lower rate of Factor 2 emotions compared to Rewa - a similar PAT Maths achieving girl and Ned - a higher Maths achieving boy.

In order to determine the concept learning of the four target children, their pre-test scores were subtracted from their post- test scores. These results are reported in Table 6.7.

Table 6.7

Pre-test, Post-test Scores [a] and Concept Learning (Study 18)

Subject	Pre-Test	Post-Test	Items Learned
Libby	48	58	10
Rewa	35	56	21
Ned	38	54	16
Rod	42	59	17

[a] Out of 87.

None of the four target children had studied the topic of the Aztecs before, but all four children were correct on more than 30% of the items in the pre-test (Table 6.7). This raises the issue of whether the test accurately measured prior knowledge about the Aztecs specifically. Some of the items may have tapped into other relevant knowledge that could be transferred logically to the Aztecs contexts. These scores may actually be demonstrating good knowledge transfer skills (Bereiter, 1997; Greeno et al, 1996). It is beyond the scope of this work to analyse the structure of the pre- and post-tests, but it is important to acknowledge the potential shortcomings of multiple choice test items. Nevertheless, it was a useful baseline to determine whether there was any increase in specific knowledge gained by the end of the unit.

Some items that children got correct on their pre-test, were incorrect on the post-test. This suggests that guesswork occurred on the pre-test. For others, the children were also correct again on the post-test. Rewa had the lowest pre-test score and improved her post-test score by 21 which was the highest increase but not the highest score. Libby learned the least new concepts, but still

had the second highest total score behind Rod. As also noted for Study 17 and by some of the children during interview, tests themselves might elicit negative emotions negatively influencing the children' test performance.

Rewa learned the most new concepts (Table 6.7), and also reported the most frequent rate of Factor 2 emotions (Table 6.5). She also reported the most frequent rate of at least two of the three Factor 2 emotions on occasions when she was not reporting all three. Rewa had also reported happy on every occasion sampled. Rewa's results are consistent with the trend for girls to report Factor 2 and happy more than boys, also supporting the trend for happy to be correlated with Factor 2. However, Rewa's results were not consistent with the finding that higher frequencies of happy correlated with a lower improvement in test score. This perhaps confirms the significant relationship between happy and Factor 2 – when they do co-occur. Rewa's consistency in reporting happy may have predisposed her to experiencing the Factor 2 emotions. Recall that Abby (Study 17) also reported a similar combination and she increased her post-test score more than the other target children in her study. Ned and Rod learned a similar number of new concepts. Ned had reported Factor 2 emotions more frequently than Rod, both boys reporting a similar frequency of negative emotions. Libby was in the highest percentile for Factor 1 and learned the least new concepts.

Recall that in the factor analysis computed for Study 18 only, Factor 3 - comprising energetic and frustrated, was obtained. This "high energy" ambivalence correlated significantly and positively with pre-test scores, meaning that children with higher pre-test scores tended to report these emotions more frequently. In Rod's case these two emotions occurred together on Day 8/2 only (Table 6.5), which was the occasion that he also reported angry and stressed. On day 8/2 Rod and his group could not find what they needed on the internet, although "they appeared very keen to use it" (Nuthall, observation notes). On this occasion also Jack and Denzil wandered off after a while. The only other occasion of reporting energetic was on Day 7 (discussed above) when Rod also reported stressed (Table 6.5). Rod had the second highest pre-test score.

Similar to the findings from the four target children from Study 17, individual differences were evident. Rewa represents an example of girls in general reporting the highest frequencies of Factor 2 emotions. Libby represents an example of the lower achieving children who did not report high frequencies of Factor 2 emotions. Ned represents an example of the high achieving boys who reported Factor 2 emotions more than the girls overall, and Rod is the exception in his

category. As a high achieving boy, he is located in the mid-percentiles for Factor 1 emotions, and low percentiles for Factor 2 emotions. However, Rod learned more (only by one) new concepts than a fellow high-achieving boy (Ned), and both boys learned less than a lower achieving girl. Using the pre-test measure, all four children had plenty of room to improve their test scores more than they did. As discussed for Study 17 above, these findings might reflect the lack of relevance of the events sampled to the pre- and post- tests. In order to determine whether specific emotions were related to specific learning outcomes for the subjects, relevant activities during ESM events toward their learning outcomes are briefly identified below.

Learning Outcomes

Learning outcomes for Study 18 included completion of an individual research notebook, a joint presentation to the class, individual completion of an authentic Aztec mask and for our research purposes, new knowledge gained as demonstrated in the post-test and at interview. Evaluation of their presentation was given at the end of each presentation, through verbal feedback from the class to the teacher who recorded the evaluations on the white board. This may have had some relevance to some children feeling nervous as the time for presentations drew nearer. From the post-test, three items which were not included in the data above, were as follows:

> What do you think was the most interesting thing you learned about the Aztecs?
>
> Where did you find out **most** about the Aztecs?
>
> How interesting was it for you, studying the lives of the Aztec people?

What was the most interesting thing they learned?

Libby: Sacrifices
Rewa: Learning about the calendar and learning how to speak a little in Spanish
Rod: About they're (sic) wars and how they sacrificed people
Ned: The warfare and warriors

Each of the answers given by the target children reflects their individual research topic. Their successful learning within these areas was also confirmed by comparing the relevant pre-and post-test items - where possible - for the individual children. For example, Rewa's engagement with new concepts learned was the most readily captured during ESM sampling. This is logical considering that she learned the most new concepts, which indicated that she had been engaged in new learning moments more frequently than the other target children had been.

During several ESM events, Rewa was engaged in either reading or talking about a specific test item or new concept that she improved on for the post-test. For example, Item 6 on the pre-test was a map of the world on which the children were asked to "put an x in the place where the ancient Aztecs lived". Rod was the only child in the whole class who answered this question correctly at pre-test, and Rewa was the only target child who learned this. ESM and observation data show that Rewa was reading the relevant information to answer this item at the time of ESM sampling on Day 8/1 at 11.56am. At this time she circled happy and interested on the mood slip. Three minutes earlier at 11.53am, Rewa had pointed something out to Elle, showing her the map in the book. During the afternoon of the same day (Day 8/2) Rewa read about the Aztec's favourite drink being hot chocolate. She circled happy on that occasion. She also read about their favourite drink again on Day 12, when she circled all three Factor 2 emotions. On the pre-test Rewa had not known what the Aztecs' favourite drink was. On the post-test she answered this correctly – it was hot chocolate. Rewa also learned why the Aztecs had such a large market. She answered, "to buy food, to trade blankets, cloths (sic. clothes) and slaves". On Day 10, when she circled the Factor 2 emotions of interested and excited plus happy, she was reading about the "busy and crowded markets". There were colourful illustrations of the items of clothing that might be traded. Rewa also read about farming and food on that occasion.

The other three target children also read many of the same books as Rewa, and they also learned that hot chocolate was the Aztecs' favourite drink. They also all learned that the reason why the wars were fought was that the Aztecs needed people to sacrifice. The whole class appeared to attend to Libby's poem on Day 10, and the topic of sacrificing was closely aligned with the topic of warfare. Aztec sacrifice of children was the most popular aspect of the topic but this was not in the test. There were two test items about the Aztec temple that related to sacrifices. Item 10 asked about the use of the temple's flat top as the site for sacrificing. The correct answer was for "taking out the heart of a human being". On the pre-test, none of the target children got this correct. On the post-test they all got this correct. The second item about temples was Item 17, which included a picture of the city with several temple-like buildings with flat roofs. The item asked the children to draw a large arrow pointing to "the place where human beings were sacrificed to the great god". Libby was the only target child who got this answer correct. This possibly reflects her greater knowledge as the "expert" from her own research. Libby had read relevant pages with pictures of temples on several occasions, including even when she was bored and tired (Day 14).

Ned and Rod both researched warfare. Item 5 gave three options of characteristics about the Aztec people. The correct answer was, "the Aztecs were people who were almost always fighting wars". None of the target children got this correct on the pre-test. Despite this item's relevance to Ned's research, he did not know this at the post-test and neither did Rewa. Rod and Libby learned this and gave the correct answer on the post-test. This answer also related to Libby's topic and she had been reading various books including how prisoners of war were sacrificed on Day 8/1, which was one of her happy and curious occasions (Table 6.5). Libby also read about the purpose of warfare to gather victims for sacrifice on Day 10, and later in the session she read about the temple district. Day 10 was the ESM event where Libby reported her most positive emotions of interested and curious as well as being sad and tired. Rod also read and wrote about warfare – specifically the Spanish invasion, on Day 10 when he circled happy and stressed.

Overall Ned appeared to read fewer books than the other three target children, until the last few days when he and Dexter realised they needed more information for their poster. For example on Day 13/1, Ned read about the weapons used by the Aztec warriors, including the information that obsidian blades were used. He wrote this fact on their poster. However, Ned gave a different answer in the post-test only item, about what weapons were used. In the post-test only, the children were asked to name and draw a weapon used by the Aztecs. Ned named and drew a "battle axe". Rod gave the most detailed answer of a "maquhuitil made of wood and obsidian". Rod had read this on Day 8/1 when he reported interested. The use of obsidian was mentioned in several of the books and specific pages read by Rod and Libby. Rewa and Libby both named and drew a "bow and arrow". Rewa also added " spear - made of wood, rock and jade". The spears were stated as being obsidian in the book that they had read, and it is unclear where Rewa gleaned "jade", which did not appear to be correct.

In summary, from these few examples, we can see that during individual learning moments, the target children reported positive emotions from the Factor 2 cluster. It is noteworthy that Rewa who reported the most frequent rate of the full Factor 2 emotions and Happy has also learned the most new concepts. These individual concept learning examples also indicate that having chosen a specific research topic, concepts of relevance to that topic were more likely to be learned by the individual target children. So what was it about the topics that caused them to be chosen? During their video-cued interviews, I asked the target children how they had chosen their topic and their mode of presentation. Their answers to why they chose their topics are set out below:

Libby: We thought they were the most interesting
Rewa: It just sounded interesting
Rod: I just thought about what things I'd like to learn. What things are interesting that I didn't know
Ned: What weapons and battle tactics they were my like main interests

These responses are consistent with the evidence presented so far. It seems that having been able to choose their own topic of interest has both facilitated their learning of relevant material and persisted through to their retrospective report that the most interesting thing they learned was the topic that originally promised to be the most interesting to research. Note that Libby has said "we" rather than "I", confirming that her decision was made jointly with Kirsty and Jodie. Next, asked the target children why they had chosen their specific mode of presentation.

Libby: We usually do a poster so it wasn't very creative...
It looked OK, but yeah (laughs).
Interviewer: Would you have thought of doing a hyperstudio?
Libby: No probably not that good at hyperstudio.
I: Oh Ok, yeah cos I noticed that people did hyperstudio?
Libby: We decided on a booklet or a poster and we chose poster cos poster was easiest.

Rewa: Cos posters don't take a long time to do.
I: OK are they hard to do?
R: Not really.
I: Not really, and did you think of doing a hyperstudio at all?
R: Not really.
I: So why didn't you think of doing that method?
R: Um Cos all the boys were doing that stuff.
I: Oh were they? If they hadn't been would you have wanted to?
R: No not really.
I: So I wonder why it is that the boys do that and the girls didn't?
R: Um I think it's because um all the boys like getting the computer and stuff.

Rod: (hyperstudio) yeah, that's what I usually do
I: Is that what you usually do? So I wondered why you chose to do that, and not a poster?
Rod: Oh I hate posters and if there's one thing I hate it's posters
I: You hate posters and you..
Rod: I hate posters and I like doing computer
I: You like doing computers OK.
Rod: Cos it's quicker and it's easier.

Ned: We just didn't really have enough people (for the role play), and it (poster) was probably one of the quickest things. (it was Dexter's idea) and then I just sort of agreed.

Ned's response above came during an interview with one of the other researchers. During that interview Ned also confirmed that if he were ever feeling unsure, he would usually choose the quickest and easiest thing to do. During his video-cued interview with me, Ned explained a little more about how he felt about his poster.

Ned: When me and Daniel were presenting our poster I was sort of feeling nervous and relaxed there.
I: Which bit would be nervous and which bit would be relaxed?
Ned: Oh sort of like the end part would be relaxed and the rest of it would be like nervous.

Ned also later said that he felt, "oh sort of like a bit ashamed of how the poster turned out". Dexter also said that, "it's not the best work I have done". The four conversations above indicate that presentation mode was chosen on the basis of expediency. For Rod, who has high computer skills, choosing computers was easier than doing a poster. In contrast, Libby and Rewa find posters easier and quicker. Ned was quite skilled on the computer and actually did an extra piece of work – a poem – on the computer on one occasion during the morning break. However he did not seem to think of it for the research presentation. Overall it seems that once the role-play was off, he was less concerned about presentation mode, and deferred to Dexter's choice.

The next question they answered was:

Where did you find out most about the Aztecs?

All four children checked the statement: **"From books in the classroom"**. Although Ned had spent at least two sessions on the computer looking for information on Day 8/1 and 8/2, he did not have any success. At the time of ESM on Day 8/1 he circled bored at 11.36am, because he could not find anything. Ten minutes later he was frowning and said, "nothing here", and just before 11.50am when a second mood slip was offered to him, Ned was saying, "there's absolutely nothing" and grimacing. He wrote *hot* on the mood slip. By the afternoon, Ned circled curious, at which time he was still trying to find information. Shortly afterwards, he and the other boy working with him started to search non-content related pages. Ned had more success from the books, but mainly used these books later in the study. Rod's experience was similar and he reported stressed on one occasion when he was also searching the net for information.

Amongst the many books that the teacher had provided were several that had good explanations about warfare and weapons. As we saw from the brief summaries, Ned spent less time using these

resources until it was almost the last minute. It was interesting too that Rewa's ESM data happened to capture several events of her reading and being actively engaged in her topic. First, she did better on her own than when the teacher was trying to help her with questions on Day 7 (above). Second, for much of the time – not recorded at ESM time, Rewa was practising her Irish dancing steps. In between getting books, or standing with Elle watching her write on their poster, or colouring in her poster, Rewa continually danced. It appeared that she was dancing as her main activity, but the ESM results in conjunction with her successful learning of the most new concepts demonstrate that her dancing was not distracting her. Rather - based on specific interview and observation data on these children's experience and theories of boredom, Rewa may well have been dancing so that she could stay in the moment and not get lost in boredom. The boredom findings from the wider sample from all six Studies 13 – 18 will be reported in a subsequent publication.

Learning related to the Mask Activity

There was only one test item relating to the mask activity. This was not included in the pre-test, but included only in the post-test as follows:

Item 28: Why did the Aztecs wear coloured masks?

Libby: To please their gods
Rewa: For sacrifices and to go to war
Rod: Because they looked like a god. And to scare their enemies.
Ned: To show how powerful they were in battle. Like the eagle knights and jaguar knights.

There was no correct answer provided for marking these answers, and I have not been successful in researching this five years later. All these answers may be correct to a greater or lesser degree. They have each touched on an aspect of the wearing of masks, but most of the material to hand indicates that it was mainly for warfare and possibly the priests wore them for sacrificing. In this respect the answers given by the target children have been made relevant to their individual research topics. This item was included in the post-test to see whether the academic purpose underlying this task was internalised by the target children.

During their video-cued interviews, I asked them about the Aztec mask making activity. Neither Libby nor Rewa knew why the teacher wanted them to make the Aztec mask. They both chose to make a Quetzacotil "feathered serpent" mask, but their reasons were based on other people. For

example, Rewa's reason was "cos um I heard Miss H talking to someone and she said it would be good mask to do". Libby explained that, "I didn't really choose. Well, Jodie and Kirsty were doing the Quetzacotil one and yeah so I decided to. It looked pretty hard but Jodie and Kirsty were doing it so I thought oh I'll do it". Ned thought they did the masks, "probably just to get an idea of what they looked like". Ned chose to do a jaguar mask, which was a warrior's mask. Rod also chose a warrior's mask. Rod explained that they were asked to make the masks because, "Like she (the teacher) said you have to do something construction for your portfolio, and like cos we had to take a photo of it, and also it's something good, basic art - that is true about the Aztecs. And you're like researching." Rod appears to have understood that this art activity would meet two goals and would be relevant to their research.

Rod chose to do an eagle mask, which he had found in a book and which took him right up till the end of the study to complete. He was painstakingly thorough in building up the beak over several sessions, which took a long time to dry. He chose this mask because it was "different from everyone else's, and yeah I thought it would be quite easy to do which it wasn't though". Rod was also concerned that he did not want to appear to be copying anyone. Compared to the other three target children, Rod was less socially interactive during the mask-making sessions and was very focused on his mask.

Expectations versus Outcomes

Similar to Study 17, the pre-test also included a question about their expectations for the topic. The question was put, "How interesting will it be for you, studying the lives of the Aztec people?" The post-test also asked the same question again, framed as "How interesting was it for you...?"

This was a multiple-choice item on both tests, with six options ranging from exciting through to boring. The target children checked the box beside the statement they agreed with as follows:

	Expectation	**Outcome**
Libby:	Mostly it will be a bit boring	I found all of it was boring
Rewa:	Some of it will be interesting	It was very interesting
Rod:	Some of it will be interesting	Rod drew and put a check in a box of his own between "it was very interesting" and "some of it was interesting"
Ned:	Some of it will be interesting	Some of it was interesting

Comparing their pre- and post- test responses, we can see that Libby's retrospective view was that it was worse than expected, moving from *some* to all of it being boring. Libby's global retrospective review does not reflect the rare occasions that she reported curious or interested. However they were rare and across every minute of the unit (including those that were not sampled by ESM, which has only captured approximately 20 minutes across five weeks), such rare peaks may have been forgotten and/or irrelevant overall. Recall that the main thing Libby likes about school is Fridays (introduction to my thesis).

Rewa's retrospective review indicates that the unit was more interesting than anticipated, and was consistent with her ESM results of the most frequent reporting of Factor 2 emotions and positive emotions in general.

Rod created his own in-between category for answering this question. This suggests that some of it was very interesting, which was also better than expected. Comparing this to his ESM data, we can see that while Rod had circled interested on only two occasions, he reported happy on several occasions. For Rod, happy is the feeling he has when he can finally get on with doing something, and he feels happy when he is doing maths. This suggests that for Rod, happy is an academically positive emotion.

Ned both expected and found that only "some of it was interesting". However during ESM, his rate of Factor 2 emotions was identical to Rewa's who found it very interesting. These differences suggest that there were individual differences in reporting style for these three children.

Results so Far

The qualitative results from Study 18 have provided contextual information for selected ESM events sampled. As we also found for the Study 17 target children, the topics chosen on the basis of interest have been reported as interesting beyond the completion of the unit of study. Because we were able to find more events of new learning in Study 18, we have also seen that where the new learning related to the most interesting things about the study, Factor 2 emotions were implicated. This was true for Libby also, even though she had minimal positive emotion reports. When she was interested, she was reading and talking about sacrifices. The evidence that she was later bored during events relating to her topic of sacrificing perhaps indicates the success and persistence of the earlier learning when she *was* interested, despite later becoming bored.

Repetition of material or doing things you have already done before are correlates of boredom for many of the target children. We have also found that when Rewa - whose research was about the Aztec clock, reported feeling the Factor 2 emotions during reading of *other* topics including maps and markets, she also learned the concept she was attending to at the time.

Rod and Ned were high achieving boys in maths, who had contrasting experiences. One major difference was Rod's leadership role and his apparent sense of responsibility about making sure the group task was done, despite the lack of real assistance from the other two boys in his group. Ned did not have that stress, and because Dexter is one of his friends and a preferred person to work with, they had a lot of "high jinks" together during their research times. Another difference was Rod's higher reading comprehension achievement. This might have been relevant in Ned's preference for a role-play, and for leaving some necessary reading until the last minute. Rewa and Libby also worked with preferred peers, so that their social contexts were also optimal. Due to not presenting all the Study 18 data in this work, I have not provided the mood slip data from the children that the target children were working with. When Ned was with Dexter, and Rewa was with Elle at times of ESM sampling, they tended to be similar in their emotion words circled. Similarly, when Libby was reporting negative emotions, either Kirsty or Jodie or often reported similar emotions. Despite reporting bored, Libby engaged in a lot of giggling and general chatting during the research and mask making activities. Her reports of bored accurately reflected her lack of interest in the topic once it had been done to their satisfaction – although they could have actually done more. Much of her giggling and chatting was non-content related. For example, when making their masks, the three girls would only use bits of newspaper that had information about pop stars on it.

As I also found for Study 17, each target child's experience of any given classroom moment in time in Study 18 was uniquely different. Resources used and social factors were also relevant variables. Not being able to find information was a source of stress or other Factor 1 emotions. When it came to making practical choices about their presentations, each child has chosen on the basis of what was quickest or easiest to do. This issue will be also addressed in more detail in the analysis of the emotions of the four target children from Study 17.

The results presented for Study 18 have been limited to these selected ESM events. As with Study 17, numerous other events also occurred, which video-cued interviews have also explored. For the purposes of this chapter, the statistical findings have provided useful windows to focus our

attention solely on those events that can be usefully compared between the two classrooms and with the full sample.

Discussion

In this chapter I have identified and analysed selected ESM events. The emotions reported by the four target children in both Studies 17 and 18 were presented and analysed in relation to the three emotion factors Factors 1, 2 and 3 and the variables of achievement, gender and concept learning. For Study 17, I was unable to identify many learning events as the target children already had high prior knowledge of their Space topic, and only five events were sampled. For Study 18, more learning events were obtainable due to the length of the study and less prior knowledge held by the target children. Although there was no statistically-significant relationship between Factor 2 and number of items learned by the whole sample overall in the statistical findings, I was able to identify a number of successful learning events associated with some or all of the Factor 2 emotions for individual target children. In addition, I also identified the occurrence of Factor 1 emotions in relation to specific variables that would be consistent with Lazarus's (1991) core relational themes for these specific negative emotions.

Having spent some time with the eight target children in their two classrooms, examining the specific contexts of relevant ESM events, I have been able to find the contextual and within-child variables that might be relevant to their individual ESM data. I have found that on some occasions, the Factor 2 emotions were reported during events of cognitive engagement with new concepts. Post-test data subsequently demonstrated that these new concepts were learned by the individual target children. I also found that each target child, irrespective of - gender, achievement, concept learning overall and emotion Factor percentiles, reported finding at least one interesting "thing" learned. Their learning of their most interesting information persisted beyond completion of the unit. Because they repeatedly engaged in this material that was interesting, these children may have learned any relevant new concepts simply through having at least three to four meaningful interactions with the information (Nuthall, 1999). However, the material needed to be interesting to attract their attention in the first place. Bearing in mind that the content seen as most interesting differed across the target children, apart from Ned and Rod both being interested in Aztec warfare, what was it about specific information that appealed to some target children and not others?

Due to the different structures of the instruction evaluation systems in each classroom, the target children in Study 17 worked (or not) their way through a series of choices of tasks. The target children in Study 18 were able to choose their research topic, which for each was based on what seemed to be interesting. However when it came to choosing their mode of presentation, the target children in Study 18 chose on the basis of quick and easy. The choices these children made were also influenced by social factors, such as choosing the topic based on friends also choosing it (Libby), or going along with friends in what mode of presentation would be used (Ned).

The qualitative analyses have also identified other social variables, with the most graphic examples being related to Abby in Study 17. In Abby's case the bullying observed appears to be incongruent with her positive emotion reports. In contrast, Rod and Dion have reported negative emotions when they have been in negative social situations at the time of reporting, or when there has been an academic demand that they were having trouble with. I have presented evidence of negative emotional contagion (Jenkins & Oatley, 1998) in the single example presented from Day 9 in Study 17, and in various examples cited from Study 18. It also appeared that the teacher's emotions were also relevant, as in the Day 9 (Study 17) example. As an example of positive emotional contagion, Rewa seems to have enjoyed her social context, with many of her Factor 2 reports coinciding with being with Elle. A further variable associated with working with Elle, was that she brought in a real Aztec calendar, providing a unique and helpful resource.

At the end of the previous chapter, I acknowledged that the significance of emotions had been identified but not necessarily their role. Has this qualitative analysis moved us any further towards identifying the role of emotions in children's learning task engagement? According to Lazarus's (1991) cognitive-motivational-relational theory, antecedent variables that will predict a person's appraisal and coping processes are required in an adaptational encounter. These include within-person variables and environmental variables. Within-person – or personality (Lazarus, 1991) variables include motives and beliefs, while the environmental variables include "demands, constraints and resources or opportunities" (p.438). Lazarus also acknowledges that the timing of encounters, their imminence and ambiguity will influence how a person reacts and responds in each adaptational encounter.

The examples presented in this qualitative summary have demonstrated between-subject differences in both within-subject and environmental variables as at the time of ESM or video-cued interview reports of emotions experienced at the time of various adaptational encounters.

For example, within-subject variables include each target child's personal skills and knowledge system (Nuthall, 2000), containing their unique prior knowledge, their learned biases (Jenkins & Oatley, 1998) of responding to certain types of events in the classroom, and their unique (learned) preferences for certain topics or learning domains. For example, Lois and Dion have different personal skills and knowledge and preferences. These differences might explain the differences in their emotions reported during ESM events. Environmental variables include each target child's unique physical context such as where a child sits in relation to resources or classroom traffic (Abby) and social contexts, which sometimes overlap. For example, sitting next to Timothy was annoying for Dion, who was probably more likely to be hit on the head by Timothy, than Lois would have been - despite Lois being seated on the other side of Timothy. However, in coping with this type of situation, Dion's annoyance is a consequence of the adaptational encounter or dependent variable (Strongman, 2003) rather than being the antecedent or independent variable. Being hit on the head elicits the emotion. If this happens frequently enough when Dion sits next to Timothy, remembering the consequences of sitting next to Timothy would rotate annoyance through to being an antecedent variable, in that the very thought of sitting next to Timothy might elicit annoyance. Hence Dion's explanation to me that, "it's annoying sitting next to Timothy:"

In this chapter, I have presented compelling evidence for the role of context in children's classroom emotions. The contextual data presented alongside the ESM data is more consistent with Lazarus's (1991) argument that these patterns of recurrences of certain emotions do not reflect traits, but more accurately reflect the children's responses to their frequently recurring similar environments. The same children have reported different emotions based on the differences in their contexts at the time. In Study 17, ESM happened to capture similar types of events each time. However, even the Study 17 target children who might appear to have consistent emotion traits, have responded subtly differently to subtly different situations. Lois was the only target child to circle the exact same emotions on every occasion. However, even she modified her responses by being less effusive about loving school on Day's 8 and 9.

From the observation and my interview data presented, evidence of the target children's various strategies as they responded in the numerous adaptational encounters (Lazarus, 1991) has been presented. What is not yet determined is whether specific emotions reported have been antecedents or consequences of events. I have shown co-occurrence, but not specific cause and effect. To determine whether emotion has a role such as dependent or independent variable in learning situations we shall need to look more closely at emotion events. So, it seems that while

there is evidence of the presence of certain emotions during learning or other classroom events, what sort of role emotion actually plays is not yet clear.

The positive outcome from this and the previous chapter is that I can now argue both quantitative and qualitative support for the reliability of these children's reports of their emotions. This means that we can now confidently go to the source – the children themselves, to investigate the role of their emotions in their classroom adaptational encounters. Of course it will not be possible or even helpful to present a full analysis of every child's classroom emotions. Hence the utility of having conducted the Factor analysis towards identifying the significant classroom emotions. The following qualitative analyses will attend to the Study 17 subjects only - Lois, Abby, Joseph and Dion. We shall start with Dion, whose story begins the next chapter.

CHAPTER SEVEN:
THE ANATOMY AND PHYSIOLOGY OF A SINGLE DECISION - DION'S STORY

The qualitative findings presented in the previous chapter have indicated that children's reported emotions differed depending on the contexts during which they were sampled. This takes us right to the heart of the matter, because it is consistent with Lazarus's (1991) theory of emotion insofar as environmental variables appear to be making a difference to their individual experiences. We also saw that when the children chose new material based on interest, or reported feeling some or all of the Factor 2 emotions of interested, curious or excited while attending to new information, that new material or information was learned and retained. The children in the Space Study (Study 17) were able to choose their tasks as they went along, while the children in the Aztecs Study (Study 18) chose a single broad category for their research. They also chose which mask they would make and how they would present their research to the rest of the class. Their interview data were consistent in citing interest as the main criterion for choosing content. However when it came to choosing how to present their research the target children in Study 18 selected the quickest or easiest method. While they may have chosen different methods such as hyperstack versus poster, this reflected how easy the particular child found the particular method. Consistent with Lazarus's (1991) theory, these findings suggest that these target children have experienced a series of adaptational encounters in which they have weighed up the pros and cons of topics to decide which one was the most interesting. They have then weighed up the pros and cons of which method to use.

In order to test the hypothesis that choosing tasks is an adaptational encounter (Lazarus, 1991), in this chapter I shall dissect Dion's first task selection or decision-making process. Following this dissection a suggested model of his classroom decision making process will be proposed. In this chapter I shall argue that Dion's emotions have played an important role in his decision making. Subsequently this model will then be tested as to whether it also helps explain further decisions made by Dion and the decisions of the other target children in Study 17. For the purposes of discussing Dion's decision making process, evidence of his personal learning journey (Nuthall, 2000) into the space topic was obtained from observation, audio/video records, modified ESM and video-cued interviews.

Decisions are interesting because they can appear to be simple yet they are the result of a complex series of ongoing appraisals, responses to those appraisals, subsequent appraisals of the

responses in turn and so on. For example, we saw in the previous chapter that the target children chose different research topics based on their interests, but chose the quickest or easiest ways to present. Under Lazarus's (1991) cognitive-motivational-relational theory, choosing a quick or easy method might be the outcome of the children's cognitive appraisals in response to the imminent demands of the adaptational encounter – the need to decide on a method and get started so that they could get finished. As Lazarus (1991) explains, an adaptational encounter is "an ongoing transaction between person and environment having a bearing on personal goals, which are brought to the encounter, and with respect to which the environmental conditions are relevant" (p.30). The primary appraisals in the adaptational encounter include how important the situation is in relation to one's goals, whether it might "impugn one's identity, (or) highlight one's inadequacy, (or) pose a danger to one's social status" (p. 31).

For example, in choosing a *quick* method, children will get the task finished and will not be seen as slow – a characteristic of people who are not "smart" (Joseph, Study 17). In addition a quick task is also more likely to be completed, especially given the environmental "imminence" (Lazarus, 1991, p. 31) of further tasks on the list waiting to be done. Adequacy, identity and social status (Lazarus, 1991) would also be protected by choosing the easiest method whether it be poster or hyperstack, as long as the children know they can actually do this method without too many difficulties. Overall, if the main goal is to get the task done, it is sensible to choose the least emotionally stressful way.

In Lazarus's (1991) theory, "the fate of the business at hand, as appraised by the person, and the emotions experienced are conjoined, one being the basis for the other" (p. 31). However, Lazarus (1991) also acknowledges that due to the way emotion waxes and wanes – which sometimes happens abruptly, how do we find the moment when any emotional state changes due to the ongoing changes in the business at hand? This will also depend on whether the individual emotions being studied are either independent or dependent variables. Emotion as an independent variable would have an effect on the adaptational outcome, such as the consequences of anxiety (Lazarus, 1991), whereas emotion as a dependent variable would result from the adaptational encounter. For example, Rewa felt nervous (independent variable) because speeches were coming up that afternoon, and was then relaxed (dependent variable) after she had finished her speech.

Nuthall (1999) also uses the term "transactional" (p. 254) in that any knowledge gained by a student is the product of the transactional relationship between their individual participation in the

classroom learning activities and their working memory. As argued in earlier chapters, children bring their various histories including learning, social and emotional to these transactions. These important sociohistorical (Schutz & DeCuir, 2002) variables are theoretically accommodated and utilised in the constructivist classroom. Within a constructivist classroom we would expect to see children actively, cognitively and emotionally engaged in their learning and not being stressed about time constraints, or having to compromise their interests and especially not being bullied by other children. Therefore, despite having choices and being able to study things that they were interested in, why was there such a low rate of Factor 2 emotions and such a high rate of Factor 1 emotions elicited through ESM in these classrooms? In order to explore these questions, we now need to go the micro-level, to find some adaptational encounters and put them under the microscope. The first step will be to analyse one child's first choice. For example, does the first task that a child selects tell us anything about the role of interested, curious or excited in such adaptational encounters? The second step will be to determine whether this also helps us understand the role of emotion during learning task engagement and even during learning itself – if at all possible. But why Dion?

Dion was one of the four target children from Study 17, whom we met in the previous chapter. Dion was 9 years 6 months old, and of Maori ethnicity. Dion had some existing knowledge about space and was in the mid-range of PAT achievement in Maths and Comprehension (Table 6.3, Chapter Six). On his written pre-test he indicated that he was interested in space, and expected it to be a little bit hard to understand, both predictions being fulfilled based on his subsequent post-test. Dion completed two (almost three) of seven tasks he had been allocated, he learnt five new concepts tested through the multichoice items and he also learned some other interesting things. Dion presented as a pleasant boy with a ready smile, apparently enjoying himself. Yet according to his ESM data he was stressed a lot. Dion did not report any Factor 2 emotions during events that other children had done so. Therefore, Dion was an interesting place to start because of his mid-achievement level, his low achievement in Space Topic, and the contradiction between his cheerful demeanour and his reported stress.

ESM data from Dion indicated that he had felt stressed on four of the five occasions sampled. However, we did witness a different event during video-cued interview where Dion reported feeling "cool happeee" during a demonstration on Day 4, which was subsequently found to relate to his learning of the specific concept included in the demonstration. This indicates that although

Dion had not reported positive emotions during ESM events, he was actually capable of feeling positive emotions in this classroom context.

Dion's First Task Selected – Comprehension 3

Dion's first decision was made when he chose/selected the Comprehension 3 task from the full array of tasks set out before him. Recall that the Study 17 children were allocated a set number of tasks within each of the six categories of tasks based on Bloom's (1952) taxonomy – Knowledge, Comprehension, Analysis, Synthesis, Application and Evaluation.

The number of tasks was allocated during the morning session on Day 2. That same afternoon Dion chose "Comprehension 3, Explain why Earth is different to other planets". Dion only had to choose one Comprehension task. Of all the tasks across all the categories, this was the task he chose to do first. He made this choice during his first timetabled opportunity to do the space topic during the afternoon of Day 2. Dion was the only child working on the space topic during this session, while the majority of those around him were doing art (and this session was not videoed). He spent 2.5 minutes at the notice board, wrote the question into his book and then went back to his desk. Within five minutes including chatting with Lois, Edmond and Timothy about black holes, he had written two lines of text (Appendix 5, p. 458):

> "Because Earth has oxygen. Earth has houses. Earth has humun (sic.) beings.
> Earth has fresh water and salty water"

The following afternoon Dion completed 2 further lines of text:

> "Earth has trees. Earth has rockets planes, helicopters and cars"

On a later occasion, Dion completed his answer by adding into his topic book, "and right heat".

Therefore we can see that Dion chose his question, wrote it down and answered it. This sounds simple, straightforward, quick and easy. However, similar to Charles M. Schultz's Charlie Brown cartoon, in which Linus is nagging Lucy for a story, and Lucy finally gives in by saying, "Once upon a time, a man was born, he lived and then he died", Dion's story is not as simple as it seems. Dion's first choice was an adaptational encounter, holding vital evidence about Dion's needs in attending to the current business at hand, that of achieving his goals and protecting his identity

and related self-esteem variables (Lazarus, 1991). In this chapter, I shall explore Dion's first decision in the light of his other decisions in order to determine whether I can identify why it was his first choice. This chapter will present data indicating that Dion's first and subsequent choices, together with the manner and contexts in which these choices were made, provide important clues about the role of emotion in his decision-making and learning. Let us now look in more detail at the variables and events surrounding his choice of Comprehension 3 and his subsequent task engagement.

Instruction-Evaluation system

The instruction-evaluation system (Nuthall, 2000) for this 9-day unit on space was that the children had written down and signed the total number of tasks they had been given (Chapter Six). As Dion was allocated just one task under most of the categories, he was heard to say "yes" on at least two occasions, indicating that he was happy with his workload. However because Dion was allocated fewer tasks than the other three target children, this gave a public announcement of the teacher's lower expectations of him compared to others. As Dion has already explained (Chapter Six) "if someone's like real slow at work like gets three has to do three Knowledges and 2 Analysises and all that, like real high numbers then they probably wouldn't be able to finish by the end of five weeks".

The comprehension and other tasks were set out under their category headings on the large notice board as demonstrated in the previous chapter. The three comprehension tasks were set out one below the other as follows:

COMPREHENSION 1
Describe what living in space is like for astronauts today. You could write this as an astronaut's diary.

FIGURE 7.1: The Task Card for Comprehension 1

COMPREHENSION 2
Make a word search of 20 words used when talking about space.
Ask the teacher for some grid paper to put this on.

FIGURE 7.2: The Task Card for Comprehension 2

COMPREHENSION 3
Explain why the Earth is different to other planets.

FIGURE 7.3: The Task Card for Comprehension 3

Comprehension 1 and 2 contained two sentences each, while Comprehension 3 consisted of one sentence. The wording of the tasks might have been structured to suit the range of reading and comprehension ages in the class, but this was not specifically measured. Dion's individual comprehension skills would determine how well he interpreted, compared and assessed the requirements towards making a decision as to which tasks to do. From observation of Dion on Day 2 it appeared that he did not spend much time reading the Comprehension tasks in comparison to the time spent reading Knowledge tasks.

Dion took his topic book with him up to the notice board and started reading the tasks and activities. First he looked at the activity cards, followed by the tasks for Knowledge then Synthesis and then back to the Knowledge tasks again. He then looked at the Evaluation tasks before checking his contract in his topic book. It was not obvious to the observer exactly how much time he spent looking at the Comprehension tasks, and he was talking to Kane and Mike at the time. Having opened his book Dion then copied down from the board "Comprehension 3. Explain why earth is different to other planets", into his book.

Dion's Reasons

During his interview with me, Dion explained that if he been required to complete two Comprehension tasks he would have also done Comprehension 2 "cos they're (word searches are) fun". When I asked why he chose Comprehension 3, he said, "I don't know I just picked that". When he was asked why he did not choose "Comprehension 1, he said, "yeah I just reckoned it was going to be too hard". It seems that Dion's first choice was made on the basis of anticipated fun. Both Comprehension 2 and Comprehension 3 tasks would have been equally fun but in the final selection process Comprehension 3 won out. Comprehension 1 task was eliminated on the basis of his reckoning that it was going to be too hard. Dion explained his reason for not choosing something that looked too hard.

Interviewer: So why wouldn't you choose anything that's too hard?
Dion: Well I probably wouldn't finish and it'd still be too hard (laughs)
I: And you'd feel what if you were in that situation what would you feel?
Dion: Probably angry and stressed

Dion's decision to not choose a hard task appeared to involve two emotion components, first the avoidance of aversive emotions such as anger and stress, and second the choice of a fun task, the emotion correlates of which will be discussed shortly. At this stage however, Dion has not indicated what "too hard" actually means, apart from not being able to get it finished. As argued by Ames (1992) if a student perceives the goal of a task as merely being completion, as opposed to understanding and learning a concept, fear of failure - with its associated affect, becomes evident. This is consistent with Dion's explanations above and also with Rod's concerns in the previous chapter.

Comprehension 3 Content

Having suggested that the Comprehension 3 task was a simple stimulus, which might be readily perused and understood from a structural and vocabulary perspective, it is necessary to also consider the content of the task. The content asked why the Earth is different to other planets. As we have seen Dion took 2.5 minutes to decide on this task. He went back to his desk and immediately began to write his answer. Within 5 minutes he had written two lines of content without needing to ask anyone else or look up the information.

Personal Skills and Knowledge

Dion's PAT scores (Reid & Elley, 1991) for Maths and Reading Comprehension were 61 and 52 respectively, for Vocabulary 25, and for Listening Comprehension 19. His reading age matched his chronological age between 9 and 10 years (Table 4.2, Chapter Four). Dion's lower vocabulary score compared to his reading comprehension skills might have been relevant. For example, Dion looked at the Knowledge tasks twice on Day 2 prior to selecting the Comprehension 3 task. It appears that he did not understand one of the Knowledge words, as shown in the classroom excerpt below between Dion and Rhys on Day 3. The excerpt below relates to Knowledge 2, which asked for the difference between an astronaut and an astronomer.

Dion: Do you know what an ast-roh-noh-mer is?
Rhys: Astronomer? (with correct pronunciation)
D: Yes.
Rhys: Oh that's easy, an astronaut is someone who goes into space and carries out experiments.
D: Yeah?
R: Yeah basically that and an astronomer is a person who studies planets stars meteorites and..
D: What's the difference? I know he goes out in space and he studies (laughs).

The word "astronaut" had also appeared in the Comprehension 1 task (Figure 7.1), which had been eliminated on the basis of being too hard. But when reading this task it appeared to be the word "astronomer" that was the problem. Dion confirmed this during interview.

Dion: I know what an astronaut is but I didn't know what an (pronounced astra nohmer) was so I asked Rhys and he told me.
Interviewer: Did you look them up in the dictionary at all?
D: No (laughs) I just asked someone.

The above observation and subsequent interview data also indicate that the social interaction system was a relevant variable with Dion enlisting the expertise of Rhys. Recall that in the previous chapter Lois also said that Rhys "knows a lot about space". Dion's first reaction to the Knowledge tasks was further confirmed at yet a different point in the interview. During a series of cloze sentences Dion finished the sentences off as follows:

Cloze sentence: "The hardest part about space topic was..."
Dion's answer was "um that knowledge stuff".
The next cloze sentence was:
"When I get to the hard parts"
Dion: "like the knowledge stuff, I (without hesitation) "don't do it".
Interviewer: "You don't do it?"
Dion: "I go to the easy ones".

This confirms that that the Knowledge tasks had been eliminated in the first round on the basis of being too hard. However, Dion did have to come back to them otherwise he would not have been complying with the overall task requirements to complete the allocated number of tasks.

Stressed versus Cool

Dion explained on a number of occasions (in class and during interview) that he gets stressed. He also circled stressed on each occasion of ESM. Dion first defined stress for me

(observer/interviewer) on Day 9 when he was returning his mood slip (Chapter Six). As he handed the mood slip across Dion said, "I put stressed" When asked to explain what he meant by stressed, Dion explained: "It's like everything is in there (pointing to a point in the middle of his forehead) and I can't get the right things out of my head". During class Dion frequently frowned, and rubbed or hit his forehead. When he saw himself doing this on the video, he also explained, "That's probably when I got stressed (laughs)".

Dion identified a number of circumstances that caused him to feel stressed. On the occasion when he defined stress as "I can't get the right things out of my head", his group had been arguing (Day 9). Other occasions were when he was "trying to explain stuff", or "trying to think" especially when he was under time pressure. "Well like I can't do it like stressed like I'm trying to do it and I can't do it and yeah". For example, during the afternoon of Day 7 when he was working on an activity, he had just asked Edmund to "shush" so he could write, when the teacher called out "one minute!" This created a time pressure that caused him to think, "I've got to hurry". He reported that he felt "annoyed" that he did not have more time, and "that sort of cuts me off".

In contrast, his selection of and writing for the Comprehension 3 task was made in the absence of stress. When Dion was asked to give an example of a time when he was <u>not</u> cut off, Dion pointed to the completed Comprehension 3 task in his book, where he had written his answer of four lines. "That was probably that yeah". "I was thinking so much and I got heaps and heaps". "I got so much answers for the question". His source for this was "probably the cool facts book.. yeah that's a cool book.. That was the one I done lots of reading". His answers to Comprehension 3 were written without reference to any other child or text book, which is consistent with Dion's explanation above that he was thinking so much and he had "heaps and heaps" of ideas to write about.

The cool book he was referring to was *"The Usborne Book of Space"* which Dion had obtained from the resource table on Day 2. When he first started reading this book he said, "oh cool". He kept this book at his desk throughout the nine days. Dion read this book by choice during some of the silent reading sessions, which occurred every day for 20 minutes immediately prior to morning sessions of space topic. As a result he appears to have felt equipped with enough knowledge of his own to undertake the Comprehension 3 task. This reading had contributed to his knowledge about the topic, and his confidence that he knew "heaps" about it. Having some relevant content knowledge appears to be another difference between choosing Comprehension 3

and not choosing or postponing choosing the next tasks. Thus it seems that for Dion cool, thinking heaps and heaps, and not being cut off correlate with fun.

Comprehension 3 Task Mode

While all tasks/stimuli were presented in the visual mode on the notice board, the children were expected to use various modes in completing the tasks. The majority of tasks required a written mode of responding. Several tasks included drawing a diagram, while one task was to physically make a model out of plasticine. Dion has indicated that he likes reading. He has also reported at interview that he does not like art, and preferred to be taken out of class for interview during art time. One of the knowledge tasks about the Sea of Tranquillity task required a drawing and although he started this task, he did not complete it (Appendix 6, p. 461). However, Dion did indicate in interview that he liked drawing. It may be that he did not like painting but did like drawing.

One task that Dion spent a reasonable amount of time on was writing his story, which he thought was "fun". When viewing a video clip of himself writing the story, Dion described his feelings at the time as "normal" rather than happy. "Normal" for Dion might be associated with feeling happy but not necessarily. When I clarified "Would you be feeling happy at all?" Dion replied, "no, just normal". This activity did not seem to elicit a "cool" mood, hence might not have been as much fun as reading. As Dion wrote his story he frequently engaged in humorous dialogue with peers either about his story, about space-related content, or unrelated joking.

Overall it is not clear from the data whether the task mode had any impact on Dion's choice to do Comprehension 3 first. He had expressed cool fun happee (sic) emotions when viewing information which had been presented in the visual mode, for example when he had been watching the videos, during the Day 4 demonstration and during reading. When completing the Comprehension 3 task, which required a response in the written mode, Dion's rate of writing was 2 lines in 5 minutes on Day 2. This was achieved while he was also engaged in discussion and laughter about black holes and Uranus. The following day he completed the next two lines within 1 minute. On Day 2 when he had completed the first two lines, he rubbed his eyes and put his head in his hands for 1 minute before packing up. Dion has explained that he gets tired sometimes after late nights and that he puts his head down to rest. This might have been the reason for him

placing his head in his hands but it did coincide with the end of the cognitive flow of "heaps of ideas" for that time frame.

When asked which task he liked doing the best out of all the space topic things he did Dion said, "I don't know I think it was like Synthesis 3". The only number 3 task completed by Dion was the Comprehension 3 task. The only Synthesis task was Synthesis 4, which was his story. Unfortunately this answer of Dion's was not clarified at interview. Based on all the other data presented, it is not clear whether Dion was referring to the Comprehension 3 or the Synthesis 4 task. That it was not Synthesis 3 might be confirmed by Dion's own self-talk on Day 7 when he was at the notice board and said to himself, "Synthesis 3. Oh man I don't want to do that!"

When Dion Finished the Comprehension 3 Task

Immediately after he had actually completed Comprehension 3, Dion said to Edmond, "I've done Comprehension 3, Comprehension 3 is the best", after which he went up to look at the notice board again. Half an hour later having completed one of the Knowledge tasks after assistance from Rhys described earlier, Dion spoke to Edmond again.

Dion	I've done Comprehension 3, and I think it's application no it's Knowledge 2
E	inaudible
Dion	I haven't done Knowledge 1, I've done Knowledge 2. I've done Comprehension 3. That's easy (hits his head) I'm gonna get this one done.

Dion went to and from the noticeboard, and frowned before discussing Comprehension 3 with Edmond again.

Dion:	.. got cars (laughs) cos it has air.
Edmond:	It's got water vegetation and life.
Dion:	I'll tell you what I've got for Comprehension 3 (reads). Because earth has oxygen houses inaudible trees inaudible rockets inaudible and cars. Hey most planets have light.
Edmond:	inaudible
Dion:	Right we've got the right heat.

Dion then wrote into his topic book "and right heat". He then began to write his story (Synthesis 4), which featured Edmond and Tong Lim and which was undertaken with laughter and conversation throughout. The teacher checked up on Dion and Edmond 20 minutes later and said "good boy" to Dion when he said he was starting his story. As she moved on Dion said to

himself, "I can't believe that I've finished one of my things." On several other occasions Dion also made sure that he told peers that he had finished Comprehension 3 and that it was easy.

Social Interaction System

On Day 7, Dion asked Rhys about another Knowledge task, which was to locate the Sea of Tranquillity on a map of the moon. They were also asked to locate and draw some other landforms.

Dion: Rhys hey Rhys Rhys
Rhys: Yes what?
Dion: What does that mean there (pointing to Knowledge 1)
Rhys: (Reading aloud) Tranquillity on a map of the moon. Give names of other land-forms there. Find the Sea of Tranquillity, um..
Dion: So you draw on the moon.
Rhys: Yeah you draw on the moon.

In this conversation with Rhys - as also in their conversation above about the astronomer, Dion has actually worked the answer out himself, just by talking about it with Rhys, who tends to elicit positive emotions in Dion. Dion has provided this information in finishing the cloze sentences in a different section of his interview. For example, Dion said in his cloze sentences that Rhys is "my favourite person to work with", and that "working with Rhys makes me feel happy". Compared to Dion's experience of stress when he has difficulty actually getting ideas out, talking it over with someone whom he feels happy being around, appeared to be associated with Dion sorting out his thoughts himself, and realising that he does know something about the topic or what to do.

The questions Dion used to seek help from Rhys give evidence as to what it is about the tasks, which might contribute to the categorisation of "hard". Dion asked about content for one task, perhaps indicating a vocabulary problem. Vocabulary problems might also have been associated with the Sea of Tranquillity task, but there is a suggestion that Dion might not have fully understood the process required either. He sought confirmation from Rhys in his question, "So you draw on the moon?"

Classroom data confirms that Dion completed the comparison between the astronaut and astronomer following the above consultation with Rhys. His written answer was almost word for

word as explained by Rhys (Appendix 5, p. 458). Even though he did not know this material initially he completed the task without any evidence of stress once he had obtained the answer from Rhys. Dion did make a rudimentary start on the Sea of Tranquillity diagram, but succeeded in completing only an (almost) outline of the moon (Appendix 6, p. 461).

The social interaction system has been an environmental variable on several occasions relating to Dion's task selection. When faced with a difficult cognitive interpretation, Dion obtained assistance from Rhys without any obvious stress. While he had been unable to interpret the Knowledge tasks when choosing on his own on Day 2, he had (sensibly probably) left them while he had easier work to get on with. He was eventually able to attend to the hard tasks in a stress free manner. Writing his answer out straight away after talking with Rhys, was also in contrast to those times when he was "trying" to get something out of his head on to paper. Dion feels happy working with Rhys and he had also indicated during interview that he and Rhys had timetabled some topic times at the same time. This demonstrates excellent resource management skills on Dion's part.

Having completed this first task Dion was heard to let other children know, using some of their shared terminology in reporting one's achievement using the term "easy". For example when Dion asked Rhys about the difference between an astronaut and an astronomer Rhys had said, "that's easy" before going on to explain it. Rhys tended to say "that's easy" each time as a preamble to answering peer questions, perhaps a means of confirming his knowledge status in that he finds knowledge easy. It was interesting to observe Dion then do the same thing when he told other children about his own achievement.

His statement of surprise to himself "I can't believe that I've finished one of my things" also suggests that it was a novel event to have actually completed something. In essence he has articulated to himself a challenge to an existing belief that he does not generally complete work. However, even though he thought he had finished he was able to recognise a useful piece of information from Edmond which he added to his answer – "and right heat". It appears that to complete the Comprehension 3 task, Dion was not reliant on peers and only utilised Edmond as a resource because it came up during their conversation. He had not been specifically seeking more information, yet Dion was able to recognise and utilise new information, through interaction with Edmond. However, what is missing from the social interaction system so far, is any evidence of healthy debate regarded as necessary for socio-cognitive conflict.

Social interactions for Dion were also frequently the antecedents for negative emotions. For example, as we saw in the previous chapter Timothy tended to have the opposite effect to Rhys, in that he was annoying. Working in the group on Day 9, in which the members had argued correlated with Dion having difficulty getting the right things out of his head. In this situation Dion's cognitive processing had been impaired and he had felt stressed. Others in his group had also felt annoyed at the time, with one other child also reporting stressed.

Social interactions also served to alleviate boredom and stress. In addition to Rhys's advisory role, Rhys, Edmond and some other children were frequently the source of non-content joking, acting the fool, physical activity and laughter. Dion has explained in interview that joking and laughter have the effect that "you wouldn't be bored. ... yeah I wouldn't be stressed", and he has also said that being able to talk to Edmond prevents him from becoming bored in class. However, Dion sometimes found noisy peers a nuisance and was prepared to tell Edmond to shush on one occasion so that he could write down the point he had suddenly thought of. In response to the question about whether it makes a difference, who you sit next to he said "if they're loud it does".

Dion then explained that he had also found the computer noise to be a problem. He was seated very near the computer which was very noisy on occasion and which gained his attention. He had not thought of asking people on the computer if they could turn the volume down (whereas Lois did complain to the teacher eventually and it was turned down). Dion reported in interview that he had found it hard to concentrate:

> Dion: It was hard to do the work cos it's like sort of too loud.. I kept staring at it cos it was too loud.. sometimes I don't get my work finished on the timetable.

Dion also confirmed again that trying to work when the computer was too loud made him feel "sort of angry I got angry about it couldn't do my work". Therefore it is likely that if people are too loud around him, Dion will also have difficulty getting his work done. For example, we saw that when interacting with peers and joking about black holes and Uranus, which were topics unrelated to his Comprehension 3 answer, Dion took 5 minutes to complete his two lines of writing. In contrast without distractions on the following day Dion took 1 minute to complete 2 lines of written work. Therefore even when he had "heaps of ideas" he could be distracted from writing them down. This was also something he was aware of himself.

Interactions with the Teacher

During the two sessions on Days 2 and 3 while Dion was engaged in the Comprehension 3 task, the teacher had initiated dialogue with Dion briefly on two occasions. On Day 2 when Dion had his head in his hands following 5 minutes of interrupted writing, the teacher came past and reprimanded Edmond, as well as asking whether both Dion and Edmond were working.

On Day 3 Dion missed the first 8 minutes of teacher instructions about a modification to the task selection process whereby a black dot had been added to some tasks to indicate that they should not be chosen first. Dion had spent time at the noticeboard consulting with Rhys about the Knowledge tasks. During this conversation the teacher came by and asked if they knew what the black dots meant. Dion said that they did not so the teacher recruited Abby to explain it. The teacher had one further dialogue with Dion half an hour or so later, when she came over to his desk. By this time Dion had been chatting having started on his story earlier. He showed the teacher some work he had completed earlier. She responded "oh ok good boy", before proceeding on. The teacher said to one of the observers, "I don't think much actual work is being done".

When Dion was discussing the task selection process and the different task categories with me, he explained that he had not known what the categories meant, but he had not asked the teacher. (Incidentally, none of the target children knew these, and the teacher had not explained their cognitive dimensions.) I asked him if that was a problem for him.

Dion: No not really I want to learn stuff
I: you want to know stuff ok but you didn't go and ask the teacher at all
D: no laughs
I: what would have happened if you'd gone and asked her
D: I don't know I should try it

On other occasions Dion was heard to recommend to other children to go and ask the teacher. From the data presented it appears that Dion prefers to seek information and guidance from peers rather than the teacher. The teacher did not play a significant role in his response to Comprehension 3. Over the two days of his working on this task, her speech to Dion comprised a general instruction, an event of non-specific praise, and a reprimand to keep working.

Choice of Comprehension 3 Summarised so Far

In summary, Dion spent 2.5 minutes after lunch on Day 2, viewing a range of tasks from which he chose Comprehension 3 to commence with. This was the task which first gained and sustained his attention. His existing knowledge - his sole resource for the task, was both established and recently acquired. He had some existing knowledge at the pre-test, and he had started reading the "cool facts" book during silent reading that morning. Based on the model proposed by Nuthall and Alton-Lee (1997) information from the "cool" book would have still been in Dion's short term memory where known concepts would be contributing to its integration to eventually create new concepts in long term memory. All that Dion was aware of, however, was that the book was cool, and that cool makes him happy.

For this particular task Dion did not need assistance from the teacher or from peers, which might have been an advantage considering that he was the only child working on topic at the time. Before final completion of the task on the following day, Dion did obtain additional information from Edmond.

So far we have seen that a range of cues were interpreted by Dion as contributing towards his appraisal that the Comprehension 3 task was not hard and would be fun. During interviews Dion repeated his answer to Comprehension 3 from memory on more than one occasion demonstrating that the general concept had been learned and retained. However, because Dion had not looked this up at all, there is no evidence that this was new learning due to the task. The task was an opportunity for him to write something he already knew – irrespective of whether it was earlier that morning or prior to the study.

Whether emotion is antecedent or consequence is already difficult to determine. We have seen that the environmental variable (the task stimulus) has been read and categorised, with evidence of retrospective emotional correlates of either feeling anger and stress, or fun, cool, happee. In terms of Lazarus's (1991) theory, Dion's appraisal process appears to include a prediction of the outcome in terms of how long it might take, whether there is already enough existing knowledge to cope with the imminent demand of completing the task, and so on. This cognitive analysis has also included a rehearsal of how that might feel, suggesting emotion as the predicted dependent variable or consequence of the possible decision to proceed with the task, but only retrospectively as interview data. However, Dion does appear to have learned the predicted effects of undertaking

hard tasks, and anticipation of these effects has become the antecedent or independent variables of avoidance. In effect, Dion has learnt that there are two categories of tasks, those to do and those to avoid.

Therefore Dion's first cognitive response to task selection was to categorise them according to perceived difficulty - whether the task looked easy, fun or hard. If Dion "reckon(s)" a task looks too hard, he will not do it and will do a different task. This comprises Dion's cognitive appraisal (Lazarus, 1991) of the situation. Where two tasks might have been anticipated to be equally fun, Dion was less clear in his explanation as to what attracted him to one task over the other. In general, once Dion had decided that a task fits the "hard" schema, that seemed to be all the information he required in order for him to make his decision - he knew to avoid it. This becomes a problem, because if Dion cannot cope with trying something he does not know already, how will he ever learn anything he doesn't already know?

Dion did not specifically use the term "easy" when he explained his choice of Comprehension 3, but he has used it in other contexts where tasks are categorised as to "hard" or not. "I just do the easy ones" is his reported strategy above. He described the Comprehension 3 task as fun. The information flowed as he wrote, this information having been gained from the "cool" Usborne Book, which he talked about on a number of occasions during interview. Dion not only knew the content required for this answer, he also knew what to do, which was to write out the answer. A simple question required a simple response. When Dion reported his strategy to just do the easy ones, he was clear and definite, which suggests it is a well-practised method. We shall now try to identify his emotion correlates of cool and fun.

Correlates of Cool and Fun

Dion talked about "this cool facts book" on a number of occasions to both interviewers, demonstrating the persistence of his description that the Usborne Book was "cool". There is also evidence that the cartoon drawings were an attraction for Dion and were the main reason that he chose that book to read. Dion re-iterated in three different interviews that the Usborne book was "cool". He also said he wished he still had it and he liked reading books "with funny pictures." Dion also attributed learning of some new concepts including the difference between Earth and the other planets, the definition of an asteroid, and what Saturn's rings are made of, to this cool

facts book. He likes reading and remembered a range of concepts from this cool facts book. Dion has also described other visual modes of gaining information as "cool".

Information presented in the visual mode appears to correlate with Dion's experience of cool. When Dion was watching information about space concepts, he tended to find it cool, and was actively verbally engaged throughout. In addition, we saw in the previous chapter that Dion's self-report of his emotions during the Day 4 demonstration was "cool happeee and fun". On Day 4 the whole class sat on the mat for 20 minutes during which the teacher organised three other children to give a demonstration of the orbits and rotations of Earth, the moon and the sun. We also found that Dion had learned the concept demonstrated during that event – why it gets dark at night. Dion's attentiveness during the 22-minute session on Day 4 was demonstrated by his ongoing content-related chatting with Robert whom he sat next to on the mat. He also stated several times "Oh I didn't know that" to items of information presented by the teacher, for example, when the teacher explained that it takes 24 hours for the Earth to rotate on its axis. When Dion made such utterances his voice sounded surprised and interested, and he did not seem to be stressed that this was something he did not already know. In this cool fun happee mood he was able to recognise that this was something he did not already know, but it was not stressful.

This cool fun happee mood also correlated with Dion responding in oral mode to the stimulus. As with the event in which he obtained further information from Edmond for his Comprehension 3 task, Dion demonstrated that he knew what he did actually know in order to make the assessment that this was new information. In the social context of being on the mat and being able to discuss content orally with Robert, there appeared to be no experience of stress associated with Dion detecting that he had not known something. Dion has also reported the same state in relation to watching videos.

I asked Dion, "Can you think of a time when you did learn something new when you were sitting on the mat?"

D: um On the mat well in the library watching the video.
D: Oh it was cool watching laughs.
I: When you say cool, what's cool mean?
D: You're happy and it's cool.
I: So what would be making you happy about that?
D: No work (laughs).
I: Oh, no work so you liked watching the video cos it was no work.

Dion's first rationale was that watching videos meant no work, yet he has identified it as an example of a time when he learned something. Dion went on to explain that he had learned a fact about the temperature of Venus.

I: What about Venus would you remember?
D: um That Venus is the hottest planet not mercury.
D And there was that um Venus has like heaps of clouds around it and the heat comes in but it doesn't let it out much so it's hot.
I: Oh right so you remembered that from the video. Oh right so what was it about that that caused you to remember it?
D: I don't know laughs well the teacher told us to remember a fact and say it and yeah that's what I chose.

In this context Dion had been given a specific task which was to remember one fact. With this goal in mind he had still regarded the viewing task as not being work, had felt happy and cool and had achieved the task as required. This task also required them to "say" the answer, which was an oral mode response.

When comparing subject domains, Dion categorised them as cool versus hard. For example, Dion explained that science is cool because he likes it, and space was "cooler" than science, because he likes space "a lot". Due to the retrospective timing of the question as to how space topic compared with science it is not clear whether Dion's adjective of "cooler" was derived from his retrospective view of the total experience. In other words, he might not have described it as "cooler", prior to his experience of the "cool facts book"

Having talked about how cool science and space were, Dion's explanation about maths provides an example of a contrasting experience.

I: What are the things you don't like?
D: Maths
I: Maths
D: I did like it until it's hard

In this short dialogue Dion has given supporting evidence for his definitions. He has said that he liked maths until it was hard. In this context hard means not liking a topic and that topic would also not be cool, happy and fun. This implies that cool, happy and fun might be synonyms for "easy". As demonstrated earlier, Dion has explained how he avoided the Comprehension 1 task because he "just reckoned it was going to be too hard". When Dion has learnt, it has been when

he was having fun, and felt cool and happy. However when I asked Dion about what mood is best for learning, Dion selected a different word from the list.

I: What would you choose out of that (list) that would be best for learning?
D: Interested.
I: Give me a time when you were really interested in something. Tell me about it.
D: Space yeah.

Dion had already indicated that he expected to find space interesting and found space interesting, yet "interesting'' did not come up in conversations about events. Interested came up when it was presented as a written stimulus. For example the word "interested" appeared on the pre- and post-tests, it was on the list of words for identifying examples and it was also on the mood slips. However, the presence of this word on the mood slip did not predict its selection during ESM events. "Interested" appears to correlate with cool happy fun. A little later in the same interview, Dion's interest in space was confirmed again.

I: Yeah so when you're interested what makes it easy for you to learn?
D: um Just makes it easy. I'm not bored or stressed and I don't have a tight brain yeah and it's all relaxed.
I: Yeah.
D: Yeah make um learn easier.
I: Right does that happen often?
D: Nope laughs.
I: When would be the most recent time you were really interested in something?
D: Topic.

In this short conversation Dion has introduced "relaxed" and "bored" terms which were not discussed in relation to Dion's choice of the Comprehension 3 task. Dion has also referred to a physiological dimension associated with stress – a tight brain.

Dion's Preferred Subject Domain – Reading

On several different occasions, when asked a general question as to his favourite thing to do Dion consistently replied "SRA's". "SRA" is a structured reading resource, "they are sheets, and I've done eleven of them" (said with pride). SRA's are his favourite things because they are fun, and if he was give a pink slip (mood slip) during reading these, he would circle happy. During another stage of the interview, SRA's came up as Dion's example when he was asked to think of a time when he felt had proud at school. This sense of achievement and pride appears to have occurred when Dion was doing his favourite thing, even when not having to "work" as such. As a

structured resource for self-paced work, the SRA's might be more easy to follow compared to less clearly defined tasks. Having developed a routine of working with the resource Dion would have understood the procedure. He was heard on one occasion to have been given advice by the teacher about the SRA procedure. Using this resource appears to require one on one with the teacher, which would mean that she would be fully aware of his progress and what he needed help with. In answer to the question of whether Dion loves anything about school, he answered "reading". When reading he would feel "happy, real happy".

Summary of Correlates

Dion has demonstrated consistency in his definitions and descriptions of "cool". For Dion, cool appears to mean interested and is associated with happy and fun. Videos are "fun to watch". It is also fun to read. Dion has explained that he feels "real happy" when he is reading. This is supported by Dion's response to the interviewer asking him to remember a time at school when he felt "happy". Dion's first response was "home time", to which he then added "or reading" then went on to explain his feelings about reading. This evidence in conjunction with his explanations about when he has learnt new information also suggests that Dion is able to learn when he is happy, interested, and not bored, nor stressed nor angry.

Dion has also confirmed that his cool emotion experience is the opposite of when he is doing maths. He used to like maths however until it became hard for him. This is consistent also with his explanations as to why he avoids hard tasks even within an interesting topic. Despite his interest in space Dion had predicted that any task which looked too hard would eventually cause anger and stress. Dion has also indicated that being interested occurs in the absence of boredom and stress.

It would appear therefore that Dion's preferred state is that of cool (interested) happy and fun. When Dion was in these states he appeared to learn without effort. This section has confirmed that the states of cool happee fun correlate with reading as an activity and space as a topic of study. These states also correlate with stimuli presented in the visual mode, or those requiring an oral mode of responding, from which Dion has been able to learn new concepts in the absence of boredom and stress. Dion was clear in his reasons offered as to why he learned a new concept from the video. He had been told to remember one fact. It appears that with a clear directive and being in his preferred state, Dion has successfully learned the means by which Venus is the

hottest planet. He raised this topic with Edmond on a different day as a spontaneous conversation "Hey did you know...?"

Dion has also indicated that he was interested in space, which was cooler than science, which he also likes. Dion has described interested as being incompatible with boredom and stress, the latter being a state he frequently experiences in the classroom. Dion has explained the physiology of stress as it relates to him and its management. Dion has also recommended some stress management techniques, which we shall look at next, as they are relevant to the analysis of his decision to select Comprehension 3.

Emotion: Dion's Stress Management Techniques

Data presented and analysed thus far suggests that Dion has used strategies for maintaining a happy fun cool state during classroom activities. Evidence has also been presented to support the notion that the Dion's choice of the Comprehension 3 task was not only based on choosing fun, but was also correlated with avoiding anger and stress. These predicted states associated with hard work were not instantly yielded, confirming that they were part of an automatic process. Dion's answers also suggest that such a strategy might not be confined to the single Comprehension 3 selection. This strategy may be a general technique Dion has for managing his emotions in the classroom.

Dion's descriptions of his experience of stress have been presented above. Stress appeared to be present on those occasions of "trying". "Trying" implies a sense of effort and this might be the unconscious connection which Dion makes to "work" especially work that is going to be "too hard". Dion has also described other features of the physiology of stress as he experiences it.

D: Yeah and you get real stressed yeah and then you go and then your brain gets like all tight.
I: So how do you deal with that?
D: um I just do somethink else.
I: uhhuh.
D: And then I don't get stressed any more.

Dion confirmed on another occasion that his brain goes "tight" and that his strategy is to "find something else to do". He said that this happens "quite a lot" in school. In the context of discussing how long one might stay in the same mood, Dion explained that if you were still

stressed, your brain would be getting "tighter and tighter". When he was asked whether he rubs his head when he is stressed, Dion said no. This seemed to contradict his statement during video-cued interview. When he saw himself on video hitting his head he said to me, "That's probably when I got stressed". This suggests that Dion's automatic response to stress might be evident in such gestures as well as rubbing his head, frowning and putting his head in his hands. This contradiction may be explained in the body language literature, which is beyond the scope of this work to explore.

Dion also explained that even though he does not tell the teacher that he experiences stress, if the teacher knew about if perhaps she could "put you in time out ..so you can calm down". Depending how stressed you might be it might take a couple of minutes to calm down, and your brain would then feel normal rather than tight. Other strategies suggested by Dion include reading (but only if you like reading, otherwise do something you like) and this would relax the tight brain. Dion has also previously explained how joking with friends correlates with not being stressed

Contradictions

From the data presented and analysed thus far, several contradictions have arisen. Dion stated in the pre-test that he was quite good at science, yet he also confirmed that he was slower at completing work compared to others. This perception appeared to be challenged when he did actually complete Comprehension 3 and repeated to himself on more than one occasion, "I can't believe I've finished one of my things!" He also told others of this achievement more than once and that it was an "easy" task. Perhaps this was to reconfirm the new belief, or to change his classmates' perception of his ability. As we have seen earlier, children tend to know who the higher achievers are and that slow people are not as able as quicker people like Lois.

Another contradiction occurred during the interview process with Dion (and also with some others) when they were asked to respond to individual emotion words presented in a list form which both the interviewer and the student went through together. The children were asked to think of a time when they had felt each emotion and to say out loud the first example that popped into their head. In Dion's case he was unable to give school related examples for interested, angry, or relaxed. In response to the word interested he said, "I just can't remember"; to angry he said 'I'm not angry at school"; and to relaxed, he said "no only in the weekends". This appears

contradictory as Dion himself had used these words to describe his experiences presented as interview data in this chapter. This raises methodological implications. For example when real time data is elicited, the emotion may be more readily accessed because it is being experienced. However, when asked to think of an example, this may immediately put some pressure on, especially if the emotion being asked about occurs less frequently. Yet when asked about a time when he had felt proud, Dion was able to immediately think of an example, which was moving up a reading level.

A further perhaps important contradiction is demonstrated in Dion's apparent belief that he does not learn from reading, yet also acknowledging that he has learnt about space from both videos and reading the cool facts book. This might suggest that Dion associates learning with work as opposed to that effortless learning which occurs when he is doing something he likes/loves, in a mode which is not difficult, while feeling cool fun happee. It may be that Dion's definition of reading is looking at cartoons or illustrated books rather than reading lots of text. However, his PAT Reading Comprehension score was 52, indicating that he was a mid-achiever. As noted earlier, the reading comprehension age levels of the tasks themselves were not measured and this might have been a problem if they were pitched at a higher reading level.

What Dion Learned

In addition to learning why it gets dark at night and that Saturn's rings are made from ice dust and rocks (Chapter Six), there were five specific multiple choice items that Dion got correct on the post-test as follows:

Item 12 (3): There are mountains on the moon
Item 23 (4): The fourth planet from the sun is Mars
Item 23 (6): The sixth planet from the sun is Saturn
Item 26: The pressure inside the engine is what makes the rocket go fast
Item 29: A galaxy is a large number of stars spinning in a circle

Item 12 was relevant to the Sea of Tranquillity activity. Dion's minimal drawing of the moon showed some lines on it (Appendix 6, p. 461), but it was hard to work out what they actually were. Even though he got this multichoice item correct on the post-test, he said at his post-test content interview that he did not know whether there were mountains on the moon. He explained

that he did not know why it was called a sea, "so that's why I thought there was water on it", but he knows there is no water. During his interview Dion explained that he got this information from "a picture. It's this blue bit of paper. It's near the door. Near to the poster". This was an accurate account of both the location and content of the picture. Dion had been looking at this with Rhys when he was clarifying the Knowledge task on Day 7 above. Day 7 was 7th August 2000, and this particular interview excerpt was the 22nd August 2000. Dion seemed to have an excellent visual memory for this item.

For the next two items correctly locating Mars and Saturn, "I just practised them". Dion explained:

> Well I just looked at some posters that look like these ones. Like which of them, so I knew which one's which and then I keep practising them and watching them....when I first done this sheet I didn't know like these ones. I knew these ones .

Dion made a conscious effort to learn the ones that he did not know. It was not clarified exactly how he practised them, but he included "watching them". Similar to his description of the location of a specific picture, Dion has identified visual stimuli – pictures. His total learning of the sequence of these planets involved two dimensions. First he remembered that he had not known these when he was watching the video in the library. On the video, "they called them out in order. That man, he started like from Mercury and all that'. In addition, in conjunction with hearing the information, Dion was watching it on video – which correlates with cool. He made a conscious note that this was something he did not know – during this cool event. Even more importantly he seemed to have made a conscious decision to learn this information. When asked why he wanted to learn them off, Dion did not know, nor did he know what he was thinking when he was trying to learn them. However, he eventually said it was "for fun".

For item 26, Dion explained that, "I'll just guess this" which was the correct answer. As he was thinking about where he might have come across this information before, Dion said, "Rhys knows how a rocket goes, he knows how it goes so fast and stuff". The interviewer asked if Rhys had talked about it, and Dion replied:

> Dion: Well I looked at his rocket picture up on the wall and I couldn't read it cos we had to do the work and I didn't have enough time to read it...

> Interviewer: you didn't read it exactly what he wrote but you know he knows because he did a picture of it.
> Dion: He told me but I can't remember

For Item 29, Dion said, "that's a hard one" which he did not know, and for which "I just guess a large number of stars spinning in a circle".

Overall it seems that when Dion's attention was captured through visuals either in the form of cartoons, posters, videos and pictures, and when these times of attention correlated with cool or fun or happee, Dion has remembered the new information they have contained. We have also since determined that for Dion, these are also correlates of interested.

Discussion

So far I have presented a range of evidence demonstrating what "cool" means to Dion. It appears that he has learnt new concepts during times of cool fun happee. These states in turn occurred while watching video, reading books, watching demonstrations. On the basis of reading as his preferred activity Dion had fun and felt cool reading the cool facts book. He chose to read this book most days. For Dion, cool appears to correlate with visual and oral task modes. Cool also correlates with interesting, easy, fun, not boring, brain not tight, relaxed and no work. Space was cooler than science, which might be a retrospective opinion based on his total experience. He liked space a lot.

Ideas seem to flow more when Dion is feeling cool fun happee. Such states also appear to occur when Dion is in social contact with preferred peers such as Rhys. Dion thinks he learns best when he is interested, and when his brain is relaxed and not tight. In such contexts when he comes across something he doesn't know he recognises it as new information, takes note sometimes even consciously deciding to learn it, and does not appear to become stressed by not knowing it.

The ideas flowed so well when writing the answer to Comprehension 3. Dion could not believe it when he actually finished this (or any) task. This suggests that his existing belief was the opposite. Much of Dion's description of this particular experience is consistent with Csikzentmihalyi's (1975) descriptions of flow experience.

In contrast, when describing the opposite experience of stress, its effects and his management strategies, Dion has described a type of "emotional highjack" (Goleman, 1995, p17). According to Dion when he is in a situation of having to try when it comes to thinking, getting something out of his head, or explaining something, he becomes "cut off" from his cognitive processing. This correlates with and predicts the experience of anger and stress. When faced with such a stimulus Dion automatically avoids it, or if he is unable to he will become angry and stressed and will not be able to finish the task. Dion has said he experiences stress "quite a lot". The specific antecedent stressor appears to be the sense of having to "try".

Dion appears to have established routine of avoiding work that looks too hard and choosing the easy ones. Interview yielded the reason that Dion believes he would not get hard work finished. It is interesting to note that Dion has not made any recommendations about any alternative methods to assist the "trying" in order to make any of these processes easier, to reduce the effort required. Dion's pattern of avoiding the situation of having to try is a negative reinforcement contingency (Baldwin & Baldwin, 1986). The effectiveness of this contingency in Dion's case means that he does not get the opportunity to practise a more helpful response. Avoiding the stress associated with "trying" events also avoids the opportunity for trying out alternative strategies for approaching hard tasks. The second stage of Dion's strategy is to find an alternative antecedent such as a fun task. While fun tasks remain available, this is an effective method. However, when the fun tasks run out, what happens then?

On occasions where he has not been able to avoid hard tasks Dion has sought help from Rhys. Rhys has been able to help at a superficial level. When we look at Dion's experience on Day 7, we will see that Dion went around much of the class for help, not obtaining any assistance on that occasion. Not having a clear definition of what he means by "too hard" means that Dion does not know what questions to ask to get the correct assistance of either peers or the teacher.

In the "instruction evaluation" (Nuthall, 2000) system, performance goals (Ames, 1992) appear to have been in operation thus a contributing factor to Dion's cognitive appraisal (Lazarus, 1991) that hard tasks would be best avoided. Performance goals are implied in that Dion not go and find out anything else to add to his answer. Although he added, "and right heat", his perception was that he had finished this task. There was no evidence of research other than what he knew prior to reading the task requirements. If the purpose of the space topic was to learn more and research the resources available, why did Dion not go and look up another book? This is another possible

confirmation that performance goals do not encourage exploration or research, consistent with the element of anxiety (Ames, 1992) about finishing - a feature which might therefore be enhanced for a child who is slower at completing written tasks. It is evident from the data that Dion became stressed when he felt pressured to quickly finish a task or answer a question. In contrast during non-pressured conversations about concepts especially with peers, Dion was not stressed when faced with new concepts. It is possible that the written mode (versus oral) of task engagement by children might also have impacted how much work Dion achieved. The assistance Dion has obtained from Rhys when he has described the Knowledge tasks as hard appears to be about content and process of the task. Once he knew what to do, Dion wrote his answers, if somewhat simplistically.

The structure of Dion's decision to do Comprehension 3, is summarised in the following diagram.

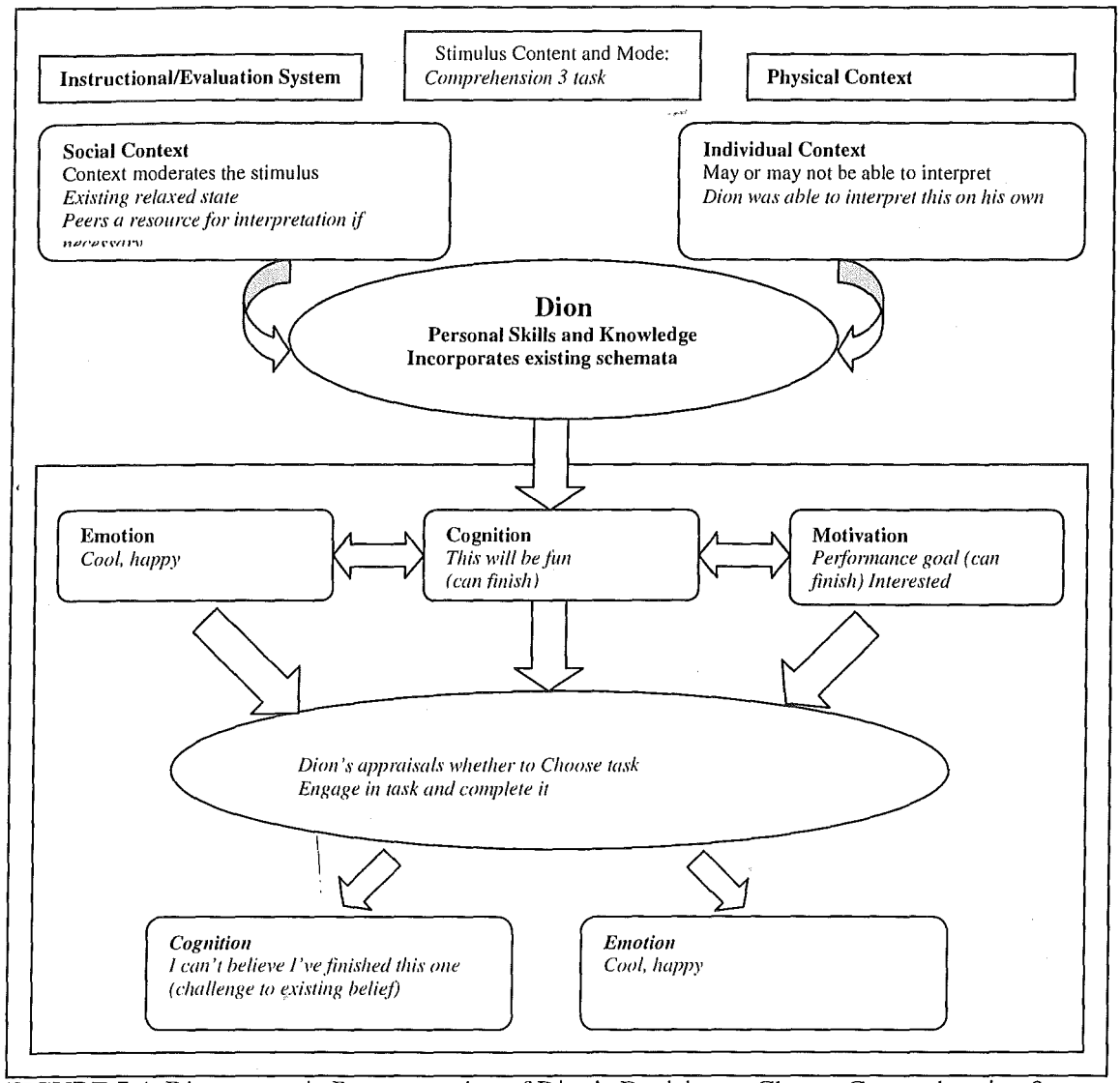

FIGURE 7.4: Diagrammatic Representation of Dion's Decision to Choose Comprehension 3

A proposed model of decision making – explanation of Figure 7.4

The model of decision making is located within Nuthall's (2000) four classroom contexts (Figure 7.4). Dion as the individual child or student is in the centre with his own personal skills and knowledge system. The instruction evaluation system and the physical context are the "umbrellas" that will influence how and why the task stimulus is accessed. For example, why does Dion need to do the task and how does the physical context facilitate his accessing and understanding of the task requirements? The particular task was the stimulus, which contained certain content and was of a certain mode, including specifying content and mode for what and how Dion needed to respond to. If the physical context is supportive and there are resources and

space to achieve the task, the impact will be positive. If the physical context denies access to resources or time and space to function, it will reduce the likelihood of the task being completed.

Generally the class will be operating in a social or individual context (Figure 7.4). For example some tasks such as tests require children to work alone. For Comprehension 3, Dion chose to work alone. On other occasions he might work with others. Dion's personal skills and knowledge include his learning and emotional history within either the individual or social context of this or any other classroom. He also has his own inter-related three functions of the mind – emotion, cognition and motivation (Snow, Corno & Jackson, 1996). As antecedent variables these three functions have been summed up in the appraisal that this task would be fun. Fun was the verbalized summary of the cognitive appraisal - which is also a motivational variable - of being able to finish. This choice would also predict feeling happee and cool. Beneath cool we have since found interested as well. Therefore the behavioural response was to engage in the activity, with dependent variables of surprise, confidence boosting and feeling cool happpee resulting from this choice. Choosing Comprehension 3 appears to have been a good decision. When Dion chose to not do a task because it looked too hard, the same type of process also occurred. In not responding to one specific stimulus, Dion's behavioural response was to then find a different stimulus.

This model is also consistent with Lazarus's adaptational encounter. The inner box of this model, within which Dion's cognitions and emotions are located, contains the internal elements of Dion's adaptational encounter. The cognitive appraisal is the result of the entwined three functions of the mind, also depicted in Lazarus's (1991) cognitive-motivational-relational theory and is the result of Dion grappling with the issues of whether he thinks he will finish, therefore should he choose this one? From the explanations so far, we have still found it difficult to separate cognition and emotion as to which comes first, as even if one precedes the other by microns of a second, by the time it is in conscious awareness it is a cognitive-emotional statement.

Any of the four contexts, including Dion's own personal context may contain antecedent environmental variables that may become the adaptational encounter of priority. For example, on Day 9, the disagreement became the stressor and was more of a priority for coping than the survival list task itself (Chapter Six).

In summary, this chapter has dissected and analysed one single decision made by 9.5 year old Dion in a level 5-6 New Zealand elementary school classroom. Dion's choice of the Comprehension 3 task as his first activity to engage in, given the opportunity to select from a range of options, has been dissected in order to examine its anatomy and physiology. In conjunction with the contextual evidence, I have argued in this chapter that Dion's emotions have been an important part of his cognitive appraisals of tasks. This chapter has argued throughout that Dion's choice was related to his wish to avoid aversive emotions particularly anger and stress, by selecting a task which would predict in his own terminology "cool fun and happy" states. Dion's avoidance of stress has prevented him from learning a more helpful response to tasks, which appear too hard. This may be a function of performance goals, which might be reversed if mastery goals were implemented.

As an adaptational encounter, we have seen that Dion's main business at hand was to proceed through a set number of tasks. In order to achieve his goal, protect his identity, and his sense of self-efficacy or "adequacy" (Lazarus, 1991, Dion could not risk choosing something that would not be completed. As it was the whole class knew he had less to do, so there was already very likely a public perception that he was not smart and that he was slow. When he actually completed this task, he was then very happy to let other children know that it was finished, and also importantly that it was "easy". Easy seems to represent having knowledge, as well as being smart. However, it is likely that Dion would need to have more than one of these types of experience to report, to boost his adequacy. Social perceptions as to knowledge or competence status have been shown to prevail over contrary evidence. Greenspan (1993) cites a story of a child whom he praised for her creative story and drawing. "The child shrugged it off. "I'm not as good as you think ... I'm only in the middle reading and math groups. The really smart kids are in the high groups" (p. 117).

This chapter has also demonstrated the persistence of Dion's explanations and attributions, which confirm the reliability of the observation and interview data. In addition, Dion's arguments have been shown to be consistent with previous findings on the psychology of emotion. The arguments put forth in this chapter support the notion that making a decision in a classroom is a complex event. While a decision might appear to take one moment or 2.5 minutes in Dion's case, there are a number of contributing factors. This chapter has demonstrated that when Dion chose to do the Comprehension 3 task the following factors were relevant:

- Dion's expectations about the topic
- his self- competence beliefs
- his goal orientation
- the predicted aversiveness of the emotional outcomes of a hard task
- his lack of strategies for approaching hard tasks
- his broad categories for determining easy versus hard tasks
- the features of the stimulus
- his existing knowledge
- the effectiveness of the resources such as the cool facts book

These appear to be antecedents or independent variables. Consequential or dependent emotion variables include his surprise at and pride in his achievement of Comprehension 3 (and SRA's), and happpee. As a dependent variable in this case Happeee would relate to having achieved progress towards his goals. In addition, being able to tell everyone that he's finished would protect his self-esteem from inadequacy (Lazarus, 1991, p. 31), and perhaps show that he learned something even though he really thought he was just doing it for fun.

Dion's own attributions concur with the well-practised nature of this process. He has indicated a positive choice based on perceived fun associated with a task, even though at times he said, "I don't know I just chose it". Dion's explanations also suggest a role for emotions as communicators (Oatley & Johnson-Laird, 1987) of progress towards goals. Dion's terminology has also been explored, confirming that even when children's emotion vocabulary is limited, their experience can still be accessed. However, it is also important to note that Dion would not be prepared to tell the teacher if he were bored for example. We need to appreciate that while emotions are excellent communicators, they are an important part of the individual child's private or internal system (Nuthall, 2000), and access to them needs to be respectful of children's privacy.

What this analysis of Dion's decision has achieved for wider dissemination, is that his descriptors of fun, cool and happee will let the teacher know that he is interested and engaged - hopefully in flow. Through exploring Dion's emotion descriptors we have been able to find out how he deals with the various adaptational encounters (Lazarus. 1991) related to engaging in classroom tasks and the resultant learning. For example, if Dion says he is stressed, we would need to take note. We would need to check out what he doesn't understand, give him a bit of space and time to

think, facilitate access to well-illustrated resources and diagrams, and allow him to talk it over with a good friend. Given the opportunity Dion has said he would not need long to relax his brain, "I'd say a couple of minutes" (Dion).

From this detailed analysis we have been able to identify Dion's needs as a student in a busy classroom. Of course Dion is but one of 27 children in the class, so it would be unrealistic for us to expect that his teacher would have time to make similar analyses of every child in the class. The children might not actually disclose their emotions or vulnerabilities to their teacher, as indicated by many of the target children in my research. Also as we have seen, apart from occasionally rubbing his head and frowning, Dion did not look stressed. Neither did he allow the teacher to pursue her inquiries about how he was doing. However, this is the purpose of my research. In order to tell the stories, we have been able to spend the time, and we have been able to explore more deeply than would be desirable on a regular basis.

Before we move on to the next chapter, has this chapter moved us any further towards answering my research question as to the role of emotion? From the evidence so far, we have found that Dion's emotions have been situated in both the antecedent and consequential environmental variables. His cognitive categories of hard versus easy or fun, have been developed with the input of his previous experience of positive and negative emotions associated with the various correlates identified. While Dion might not actually feel the anger and stress associated with "too hard" at the time of making the judgement, he prevents these emotions by avoiding the task. To that extent, these negative emotions have informed the judgement, consistent with Greenspan's (1997) view that emotions "organise experience and ultimately thinking... and behaviour" (pp. 22-23). This means that they have become included in the antecedent variables. When Dion predicts positive emotions in fun, his choice to engage and then continue with an activity such as reading, continues to elicit positive emotions, so that feeling cool and interested are concurrent with the activity. Upon finishing a task – on the rare occasions that this happens – the positive experience becomes the consequence. At any point during his task engagement, a simple question as to how he is feeling will be the quickest diagnosis of whether his needs for completing the task are being met. However in the current classroom culture that would probably be too much of a disclosure especially with other children around.

At a pragmatic level, this analysis has identified important clues about the role of Dion's emotions in his decision-making and learning. This is the most useful finding that can be sought.

In this way Dion's reports of stress versus cool "are a valuable source of information" (Lazarus, 1991, p.40) about Dion and how he is "getting along in his world" (Lazarus, 1991, p.40). A simple question as to whether things are cool or stressful, should diagnose the need for a practical intervention, such as facilitate access, explain better, check that there is adequate prior knowledge and so on.

We have also demonstrated that "fun" is a meaningful term for Dion and the other children who have explained it already in my thesis. This means that Brophy (1999) does not need to be concerned that encouraging fun is not helping intrinsic motivation. We have found that if Dion is having fun and feeling happy and cool, he will be very likely to be interested and learning something. This is consistent with the statistical findings, even though within those results, Dion is sitting in the Factor 1 emotion data.

This is another important story. It suggests that irrespective of Dion feeling stressed during the ESM events sampled, and irrespective of the repetitiveness of this type of experience, Dion was fully capable of experiencing the classroom as positively as Lois for example. So why didn't he? How was it that he only completed so few tasks, and how was it that he did not spend much time engaged in his tasks? If Comprehension 3 was a highlight in that it was an example of Dion experiencing flow, and the related positive emotions, that only accounts for a total of only five minutes across the whole Space Study. What else was happening?

Dion's story and the stories of his classmates continue in the next chapter.

CHAPTER EIGHT: DECISIONS DECISIONS

"What the hell's a 'cyclopaedia?" Mason (Study 17, Day 7)

The previous chapter has presented the argument that when Dion was given choices as to which classroom tasks he would undertake, his emotions were an important part of the process. Further it was argued that Dion's emotions were an accurate indicator of whether a given task would be achievable, and if not – his emotions were indicators that he needed assistance to actually engage in a given task. For example, Mason's question above suggests that if a child does not know what an encyclopaedia is, how could he even consider the task? In this case, Mason asked Dion, who attempted to explain that "it's a book... about everything ... (but) don't ask me. You've got to read it". Compared to the assistance Dion received from Rhys in the previous chapter, Mason was not so fortunate. He wandered off not much the wiser saying, "these blah, blah crappy words". Mason was a child with behavioural problems and was not captured in the ESM sampling during that session, but his language suggests that he was frustrated or stressed.

Dion's emotions were both antecedents and consequences in his decision-making. Dion's descriptors of fun, cool and happy were congruent with interested and flow experience (Csikszentmihalyi, 1975) and predicted task selection, task completion and successful concept learning in the case of Comprehension 3. Dion's definition of "too hard" predicted aversive emotions which would block his learning and which would prompt avoidance of such tasks, perhaps indicating a form of "emotional highjack" (Goleman, 1995, p. 17).

This chapter will analyse a range of decisions made by the four target children in Study 17 including Dion. Specific attention will be given to their first choice of task, in order to see what their individual priorities were in comparison to Dion's. Data on each target child's individual explanations of their choices were obtained through interview, whereby I went through the task options with the individual target children and their individual topic books. For each choice made, I asked why the target child chose it, and also why the child eliminated those tasks not chosen. Classroom data will be included in this analysis as appropriate. The decision making process occurred within each target child's private or internal system reflecting their unique cognitive and emotional processes (Nuthall, 2000). This chapter will conclude with the argument that – irrespective of their individual differences in achievement and preferences, the four target children have demonstrated similar processes in their individual decision-making.

Dion

As discussed in the previous chapter Dion's decision to engage in the Comprehension 3 task, was made on Day 2 of the study on Space Topic. Comprehension was only one of six categories of tasks from which task selection would be made. The following sections will present data on Dion's decisions when selecting tasks from other categories. In addition to Comprehension 3 Dion choices were as follows:

Knowledge tasks

As we saw previously Dion chose Knowledge 1 and 2. He managed to complete only Knowledge 1, the difference between an astronomer and an astronaut, eventually writing three facts on Day 3, after Rhys explained it to him. He eliminated Knowledge 3, which asked for the names of some of the spacecraft that have travelled to space, because it was "too hard (laughs)". Dion's explanations appear to be very similar to his elimination of the Comprehension 1 task (Chapter Seven). He did not know why he had *not* chosen Knowledge 4, which was to make your own space encyclopaedia. Based on his attempt to answer Mason's question, "What the hell's a 'cyclopaedia?" he had some idea of what an encyclopaedia was.

For Knowledge 2 (the Sea of Tranquillity task), Dion needed to check both the content and process of this task with Rhys. Task mode appears to have been the sole factor in Dion's conscious awareness. Dion told the interviewer that he chose this task because "I like drawing". In this particular choice, task selection did not predict task completion. During interview Dion explained that he had run out of time to finish the task.

It can be seen that social factors have been necessary for Dion in his selection of these two knowledge tasks. In both cases Dion has used Rhys as a resource for content and process information.

Analysis

Dion chose Analysis 4: " Is the sun a planet?"

Interviewer: You didn't choose researching two planets. Why not?
Dion: I don't know I thought that one there was the best for me.
I: That was the best for you so what made that one the best for you?
D: It sounded easy and it was.

His written answer took two lines. In this choice Dion has used the term "easy" which has been found to correlate with interesting, fun, not boring, brain not tight, relaxed and not work (see previous chapter). Once again with his positive choice Dion has not indicated goal orientation specifically. Responding to this stimulus appeared to be simple yet due to its similarity to the Comprehension 3 task in its apparent simplicity, Dion's decision was likely to have been as equally complex a process.

The Analysis 4 task took 2 minutes to complete 2 lines on Day 6, this task being completed whilst working solely in the individual context. Dion had written the first line without reference to a book, then flicked through other books at the book table before completing the second line.

Synthesis

Dion chose to write the story (Synthesis 4), which he found "was fun". He made this selection on Day 3 while at the notice board with Rhys discussing the astronomer and the astronaut. They were discussing how "cool" it was that the space story could be on any aspect of space and were laughing about aliens.

When Dion went back to his desk he started his story spending 10 minutes writing in his book interspersed with self talk "There was once a happy little town.." saying this first line of his story as he wrote, and chatting about his story with Edmond. Dion featured Edmond and Tong Lim in his story, which contained less about space concepts and more about aliens attacking in a graphically described battle scene. After 10 minutes he had completed two lines of story when Joseph came over to read them his own 2-page story, which was apparently very funny. By the time Dion packed up after 37 minutes, he had completed six lines of story having continued to interrupt himself as well as laughing and chatting with Edmond about it.

Application

Dion did not want to do any of these but he did pick one task and could not really explain why "I just wanted to so I picked it". He actually did not get around to doing the task, which was making a model, because "I was just doing everythink (sic.) else". When I confirmed " you only just picked it for the sake of it by the sound of it you didn't really want to do it so left it", Dion said "yeah".

Dion's Cognitive Appraisals and Emotion Correlates

These have been analysed in detail previously (Chapter Seven). This continued analysis of Dion's decisions has demonstrated consistency in his process of selection, and his cognitive appraisals (Lazarus, 1991). As with Comprehension 3, Dion selected the above tasks on the basis of liking them, predicting them to be fun or "sounded best for me" which was defined as easy. Dion eliminated tasks that were too hard and sometimes he did not know why.

Dion's emotion system correlates of the appraisals were cool, (interested) happy and fun, and have been analysed in detail (Chapter Seven). Tasks predicted as too hard, were associated with anger and stress, due to the anticipated difficulty in getting them finished.

Dion needed assistance at the interpretation phase of the Knowledge tasks. He selected and completed one of them, by repeating verbatim Rhy's explanation of the difference between an astronaut and an astronomer. Having received clarification from Rhys about both the content and process of the Sea of Tranquillity task, Dion decided to do it because he likes drawing. It appears that the mode of this task was its main attraction over the alternatives. Dion drew a circle and did not complete the task. Liking only the mode of this task did not predict task engagement.

I then asked Dion if there was anything he had done on space topic "that you're really proud of". Dion answered "the title page (laughs)... just the look, how I drew it". In this context pride in his work has correlated with the mode of drawing which he likes.

Dion's Motivation or Goal Orientation

In the absence of any specific evaluation criteria, and based on Dion's concern about finishing tasks (Chapter Seven), it has been argued that a classroom performance goal orientation (Ames, 1992) was in operation. Dion said he comes to school because "I have to, my mum's at work and yeah she works until 9.30 or something". He eventually said that he comes to school to learn.

Dion's Choices Summarised

The only tasks actually completed by Dion were those which correlated with cool, happy and fun. From his perspective, none of the cool happy fun tasks required specific reference to text-books, and the first two were completed immediately the tasks were decided upon. While Dion has said he loves reading, this has been mainly in conjunction with SRA's and the funny, cool facts book with cartoon illustrations on each page. Dion likes drawing and enjoys joking. Dion did not demonstrate any research reading skills, such as looking up an index. When "reading" books other than the cool facts book, he appeared to be flicking through the book table without any specific purpose. Once again, Dion was demonstrating very superficial reading behaviours. Recalling that Dion was have reading assistance with the SRA'S (Chapter Seven), and acknowledging that occasionally PAT data are incorrectly recorded or interpreted, Dion might have benefitted from a reassessment of his comprehension skills.

Dion's limited prior knowledge and/or prior reading from the cool facts book had equipped him to complete the tasks to his individual completion criteria. His story was about aliens and monsters and did not include any new space related concepts. Importantly from Dion's perspective, none of these tasks selected appeared to require complex cognitive processing. As has been discussed in the previous chapter, Dion becomes stressed when thoughts do not readily come to mind and he is "trying" to get ideas out of his head. This stress experience correlated with trying and with working in the written mode.

Written tasks were completed in varying amounts of time early in the 9-day unit. From the evidence in the previous chapter and in this section, Dion tended to engage in writing responses for short periods of time – at a time. For example, as we saw in the previous chapter, for Comprehension 3 he wrote two lines in five minutes *with* interruptions and two lines in 1 minute *without* interruption. This task was the one of his writing experiences which he described as "not

blocked" with "heaps of ideas" and which was consistent with flow experience (Csikszentmihalyi, 1975). In this case Dion was experiencing flow, yet was able to produce only four lines in total. For Analysis 4 he took two minutes to complete two lines. His story resulted in a total of 27 lines, which because he eventually copied it out again, amounted to 54 lines of writing. The story was completed over several days with interruptions. While engagement in these cool happy fun tasks had not correlated with stress, Dion's response rate for written tasks appeared to be less than his rate of content related oral engagement with peers.

Dion has demonstrated a consistent process of decision making when selecting and eliminating tasks in the 9-day unit on space. Task engagement data and output have demonstrated different rates of written output. Dion's output for the Comprehension 3 task in particular was the least of all four subjects (Appendix 5), as will be discussed later. Apart from the cool fun happy tasks, there was minimal further work completed. Dion drew an outline of the moon for the Sea of Tranquillity task on Day 7. He also commenced a further task writing two lines about the moon and its orbit. His final output was estimated at 20% of tasks completed.

In order to determine whether the task selection and task engagement processes were unique to Dion, Lois, Joseph and Abby were also asked about their decision-making processes.

Abby

As demonstrated already (Chapter Six), Abby was socially isolated in this class, which restricted her to working in the individual context for the majority of the time. She sat beside Joseph at the end of the row of desks, and was excluded from the social interactions of the five others in her immediate vicinity. She was frequently on the receiving end of covert verbal abuse and bullying, often being "told off" by Joseph, Nora and Jonelle whose desks joined with hers. Abby had limited prior knowledge demonstrated in the preliminary brainstorm, and in her pre-test. She expected to find the unit "very interesting" and "easy". Post-test data indicates that she did find it "very interesting" and both "mostly easy" and "very easy to understand".

Knowledge Tasks

Abby was assigned two Knowledge tasks and completed one of them. On Day 2 following the teacher's instructions Abby had Topic timetabled. Her very first choice of tasks was Knowledge 4, which is set out below:

KNOWLEDGE 4

Find the meaning of these words and make your own 'Space Ency-clopaedia'. Use pictures.

Star	Planet	Satellite	Solar
Constellation	Space shuttle	Black hole	system
Cosmonaut	Astronaut	Atmosphere	Orbit
Asteroid	Gravity	Milky way	Meteor
Comet	Galaxy	Docking	Light year
			Solar power

FIGURE 8.1: The Task Card for Knowledge 4

The word "Ency-clopaedia was broken and hyphenated exactly as demonstrated above. It is possible that this affected cldren's reading of the task, consistent with Mason's question earlier. Abby's initial response to "how did you choose that one?" was "Um I don't know." Continuing discussion yielded her elimination process:

I: What thoughts or feelings went through you to help you decide not to do those?
A: um They looked kind of hard.
I: They looked kind of hard. Was that the main thing, or was there anything else?
A: No.

At this point Abby's decision appears to have been based on elimination of the hard tasks. Abby was unable to indicate any other variables associated with her categorisation of tasks as "kind of hard" at any stage during the interviews. Her answer "I don't know" as to why she chose the Knowledge 4 task was followed up by my comparing those tasks eliminated to the single task chosen:

I: Ok , so then you chose this one and you chose some words. Now what made you think that this was a task that you would do?
A: Um it looked a bit easy.

I: It looked a bit easy, and is there any other reason?
A: No.

Abby's category of "a bit easy" did not include any emotion or mood variables initially. Subsequent phases of the interview yielded some emotion correlates in common with her descriptor of "easy". Having eliminated the hard tasks, the instructions then permitted her to "choose which ones" (words). Abby explained her selection criteria for choosing these words was, "all the ones what I knew". Therefore rather than look up words she did not know to improve her vocabulary for this encyclopaedia task, Abby limited herself to using only words that she already knew. This may have defeated the teacher's purpose but we do not know, as this was not stated.

Abby commenced writing the words down, but after a few minutes she opened her desk and surreptitiously altered her timetable. She erased "topic" from the time slot and wrote "reading" in its place. I checked whether she had changed her timetable, which was a legitimate thing to do due to the flexibility and whether we should be observing or not. Abby blushed quite brightly and said "no" and proceeded to explain that she had reading timetabled. Her blush took a few minutes to dissipate. Abby came back to the Knowledge 4 task on Day 3 using two dictionary references over a period of one hour. During this hour she had frequent interruptions, as she was sitting in a virtual thoroughfare. Other children bumped past her on several occasions, requiring her to actually hold her desk to keep everything in place on one occasion. On other occasions, she moved back and forth from her desk to the notice board, and gazed round watching others in the class, particularly a small group doing art right next to her. Her total time spent reading the dictionaries, writing and illustrating in her topic book amounted to 15.5 minutes.

However, 50 minutes into the session, she then erased the whole list of words she had done. During her interview I asked her, "I've seen you do a lot of work and then rub it all out. Why do people rub their work out?"

A: Um Cos sometimes it's messy.
I: What would be the problem with messy work?
A: Um sometimes Mrs X says um she wants like to see neat work.

Having erased her work, it was then 2.20pm. Abby opened her desk, changed the time on her watch under cover of her desk lid, and packed up. Her next timetabled topic was gym scheduled for 2.30pm.

Comprehension Tasks

Abby was allocated one Comprehension task, but chose to do two tasks. Her first choice was Comprehension 2, the Word Search "because that's nice and quick and easy". (This was in contrast to Lois who thought it would take too long). Easy in this context equated to feeling "ok" which would match "happy" as a mood word. This word search task was her preferred task. In retrospect this was the task she enjoyed the most. The second comprehension task chosen was Comprehension 3 about why the earth is different from other planets. This was completed immediately after reading it from the board and without looking up any references. This was chosen "cos it looked easy".

Synthesis

Of the synthesis tasks, Abby chose the poem and the joke and "liked doing it". At the commencement of her engagement in these tasks another child snatched the poem resource book off her.

Application

Abby found it hard to choose between two of the application tasks, and she found that making the model "was fun".

Analysis

Abby did not read the analysis tasks and did not decide on any, "cos I wanted to do all the good ones first".

Abby's Cognitive Appraisals

The interview data have demonstrated that Abby has categorised "all the good ones" (tasks) as easy or hard, or nice and quick and easy. Abby's criteria for easy have included selecting words she already knows and tasks that could be completed without any reference to resources. For example, she completed the Comprehension 3 task mainly from her existing knowledge (as did Dion). Abby has made alterations as she has seen fit, modifying task requirements (the stimulus),

and the duration and timing of tasks, effectively adapting them to her requirements. Much of Abby's decision making has been covert and it was difficult to obtain self-report data on her emotions during this part of the interview. However during other phases of the interview, further data provided some evidence of her emotion system responses.

Abby's Emotion Correlates

During video-cued interviews, the following data were yielded. Abby's reported favourite subjects are art, story writing and handwriting. Art is associated with feeling "very happy" compared to the "happy" state with reading. When Abby has the opportunity to choose something that she enjoys she chooses to paint. When she is painting she feels "excited and relaxed". Abby was unable to cite an example of any other activity, which might elicit the same feeling. Her title page for space topic was well illustrated and much time was spent illustrating her Knowledge 4 and Comprehension 3 pages.

Abby has said she finds reading "easy", she feels "happy" when she is reading. When something is easy she feels "ok" which can compare to a "bit happy". This is less than "happy". She finds handwriting "a bit easy" and would feel a "bit happy" when doing this. This suggests that the mode of response required for task engagement for selected tasks would not be a barrier to responding. Her preference for art might have been a factor in her choice of the encyclopaedia task, which she commenced first possibly due to its requirement to "Use pictures".

When asked to remember a time she really enjoyed learning something new, Abby said, "when I was watching the video". In this situation she would have been feeling "fine" which correlates with "relaxed and happy". This "happy" implies a full quantity of happy as opposed to the "bit happy". Abby's descriptions suggest that she can discriminate between different intensities of happiness, which in turn is associated with different levels of ease of work and enjoyment. Art was the only stimulus for "excited". As demonstrated in the ESM data (chapter XX) Abby had circled excited on four occasions. These occasions correlated with drawing and colouring, being at the computer with Nora, doing the word search, and being involved in a group activity respectively.

Abby said she learns best when she is not bored, and is relaxed. Abby appeared to understand the word interested as a visual stimulus for reading, but could not say it. Interested was one of the

words she circled on four of the five days of ESM as presented previously. When going through the list of emotion words Abby was unable to think of examples off the top of her head for the majority of them, which was similar to Dion's responses. Yet in response to interested, excited, and proud, Abby did find examples immediately. For example, when asked to recall a time when she had felt "interested", Abby responded, "I learned a lot of things about space". For "excited", she recalled an event of rides at the fair.

For "proud" Abby said, "yeah when I got award at assembly". When the interviewer asked Abby what part of her full work achieved on space topic was she most proud of, Abby replied:

A: All of them.
I: All the space topic ones, all of them?
A: Yep.
I: So everything you've done you'd be proud of all of it?
A: Yep.
I: You've got every right to be. So my next question is, what is it about the things that causes you to feel proud of them?
A: Um cos I thought it was fun doing them.

In this dialogue Abby has brought in the experience of fun in association with being proud of space topic tasks. Her previous dialogues have indicated that these tasks correlated with interest, relaxed, happy and easy. Abby clarified at a different point that fun and happy are "a bit the same". Easy also correlates with nice and quick, and with work she already knows. Her response to a cloze sentence at a different point confirmed: Cloze sentence: "When I am doing space topic I feel...." Abby said, "happy relaxed interested". In this case she was able to articulate the word "interested". This verbal evidence obtained through interview appears to be consistent with the experience sampling data, which was obtained during her engagement with the above tasks.

Abby's Emotion Correlates of Easy

Abby's numerous self-reports have eventually provided the emotion correlates for her definition of "easy" which was her main overt (consciously stated) criterion for task selection when given the opportunity to choose. The overt evidence amounts to her cognitive appraisals (Lazarus, 1991) in the selection process. In response to the task stimuli Abby has used her individual categories for comparing hard versus easy. While the tasks she has selected based on this categorisation process differ to those selected by Dion, Abby's emotions are similarly implicated

in this process. The emotion correlates of her choices, which she had classified overall (above) as "all the good ones" include:

Happy, relaxed, interested, fun, proud, not bored, nice and quick, I liked it.

Abby has not demonstrated any negative emotional states associated with avoiding hard tasks. However, she has identified the above positive emotions as associated with the tasks she has chosen to engage in. Abby's avoidance of hard tasks and methods of adjusting her environment appear to be successful strategies implemented without any overt or conscious emotion related reasons. While she has not identified any aversive emotions associated with hard work, she has successfully avoided such tasks. Those tasks she avoided were not associated with predicted positive mood states.

Individual versus Social Context

Abby worked in the individual context for all tasks under the categories. Her desk was next to Joseph, whose work she has a history of unauthorised copying according to Joseph. Joseph explained in his interview that his intolerance of Abby is justified, due to not only her copying of his work, but also to her alleged lying about him to the teacher and getting him into trouble. Based on the data presented earlier of Abby's successful alteration to her timetable on one occasion and the time on her watch on another, Abby has demonstrated some deception in managing her task engagement. She basically lied to the observer about changing her timetable, for which she also omitted obtaining the teacher's approval - one of the conditions of the flexible time-tabling. Joseph's statement indicates that he has also "caught her out" in deception, perhaps explaining his heightened awareness of her possibly stealing blue tack on another occasion. Apart from hearing Joseph's accusation during his interview, the issue of Abby's alleged deception was not pursued any further with either Abby or Joseph.

Abby was rarely "chosen" by others to work with them, unless perhaps through one of the girls feeling sorry for her, for example Kitty in Study 15. Even then Abby's inclusion was as a runner rather than a participant. Abby was frequently the topic of conversation of other children in her absence, in quite derogatory terms. In addition to the examples cited previously, Harry was complaining to Joseph on Day 7, "Why do I always have to get put with Mason?" to which Joseph replied "(inaudible) Nora's for everything she's put with Abby. That's worse". Unaware

of this, Abby regards Nora as her favourite person to work with. Nora sat at her table and the teacher frequently directed her to work with Abby, as noted by Joseph to Harry. When Abby was working with Nora she felt "ok", a state which she has correlated with happy. When talking about working with Nora, Abby referred to her as "my friend Nora". In response to "friendly" on the list of mood and related word stimuli, Abby said, "um I be friendly with some people like when they don't know what to do so I help them. Providing an example of when she felt happy, Abby said, "happy when um someone was helping me"

These responses suggest that Abby has associated "happy" and "friendly" with helping or being helped. These responses suggest that others might have "friendly" interactions with her because they are helping her, as opposed to social reasons. In general due to Abby's isolation from others there were few events of any demonstrated animation or facial expression in the classroom. For example, she rarely smiled at others and had minimal speech with them, such utterances being very quiet or brief such as curt responding to Joseph's or Brendan's interfering remarks. When she was seated at her desk working solitarily her expression did not change as she gazed around, apart from an occasional small smile. Her engagement in whole class activities appeared passive, due to her lack of animation. However this does not preclude listening engagement. Abby has said that she does listen which is possibly confirmed by her appropriate facial responses in whole class contexts on occasion. The teacher has reinforced Abby's listening behaviour in the whole class context.

Abby's Interactions with the Teacher

Abby explained that she had obtained assistance from the teacher for the Word Search task. She has said she is prepared to ask the teacher when she does not know what to do. On occasions when the teacher came past to check her work, Abby has not asked for assistance nor did the teacher check her work or give specific feedback about what she had written. For example, when she was working on the Knowledge 4 task on Day 3, the teacher came past and asked if she was doing the dictionary task. Abby nodded yes and the teacher moved on. On a previous occasion the teacher gave positive social attention to Abby when she was at the notice board on Day 3, praising her for being a good listener, because she appeared to know the purpose of the black dots.

Abby's Motivation or Goal Orientation

Abby said she comes to school to learn. She said she listens to the teacher and to others when she is in a group context, although her attention can wander in these contexts also. She was able to listen and learn from the video, which she had cited as an example of a time when she had enjoyed learning something new. In this context the teacher had instructed the class that each child must remember an interesting new fact from watching the video. Her successful learning of the new fact was consistent with a mastery goal of learning in this instance. Her selection of "all the good ones" and "all the ones that I know", for tasks and words in her favourite task respectively, are consistent with a performance goal orientation (Ames, 1992). Her concern about having to produce neat work could also be regarded as a performance goal as it was not specifically related to mastery of content.

Physical Context

Abby was the tallest child in the class, and explained that she found it uncomfortable, sometimes even feeling "angry and grumpy" having to sit on the mat for whole class sessions. She described it as "bit uncomfortable cos you get squashed". Her preference was to work at her desk "so I was more comfortable". Therefore during whole class discussions on the mat, Abby frequently stayed sitting in her chair for comfort's sake. This resulted in Abby being physically on the outer edge of the circle and sitting up much higher than everyone else. Often when on the mat she had her chin resting on bent knees hugged up to her chest, occupying more floor space than her peers, sometimes watching the teacher attentively, and at other times fiddling with her hair or shoe laces and gazing around. While most children verbally engaged their surrounding peers either on the mat or at their desks Abby had no such opportunities.

Abby's Choices Summarised

Detailed data presented so far demonstrates Abby's social status and that her experience of the classroom and the tasks differed to Dion's experience. In the absence of a peer resource such as Rhys, Abby has used her own discretion in interpretation of task requirements and has created her own version of the instruction evaluation system in order to actually engage in the tasks. For example, Abby successfully restructured both the structure and timing of learning task to suit her own needs. Having changed her timetable she postponed commencement of her first task. On

another occasion Abby had changed the time on her watch to perhaps justify ceasing the task and getting ready for the next session. There was no challenge to this by the teacher or peers, and Abby successfully occupied the "interim" 10 minutes appearing to be busy packing up and changing into her gym shoes. Abby also decided to not comply with the teacher's instructions to do only one Comprehension task. She chose two tasks because they looked easy and she thought the teacher would not mind. This suggests some confidence in her relationship with the teacher, whose non-specific praise has occasionally amounted to her saying to Abby, "good girl". In her preferred Knowledge task Abby did not comply with the task instructions. By reinterpreting the instruction as to how many words to use, she chose only those that she knew.

Irrespective of these and other individual differences between Abby and Dion presented so far, both children have each undergone a similar process when faced with choices. Both Abby and Dion have categorised tasks as too hard versus easy. Dion has avoided hard tasks on the basis of the predicted aversive emotions of anger and stress. Abby has not identified any aversive states associated with hard tasks. She has avoided hard tasks and has restructured some aspects of the tasks in order to make chosen tasks easier. Having eliminated the hard tasks, both Abby and Dion have proceeded with the easy tasks, for which they have each identified similar emotion or mood correlates. Abby's low PAT scores across the board may explain why she chose the simplest tasks. We shall not have more time with Abby in my thesis, but certainly on Day 7, she spent a good twenty minutes ruling up a grid for her word find, which was not necessary as the teacher had grid paper available. The positive outcome for Abby was that she was kept busy doing this ruling up and she circled the positive emotions when she filled out the mood slip. Abby's story is sadder than but equally as interesting as Dion's of course, and the evidence to date of her needs not really being met in this classroom will still be addressed in the discussion, even without any further data being included.

Lois

Lois is Korean, and at the time of this data collection (2000) had come to New Zealand in the recent past. As we saw in the previous chapter, Lois and Joseph had been allocated the same total of 16 tasks. It is not clear whether Lois had realised this, as her perception was that the teacher had high expectations of her. Lois enjoys her extra-curricular School Certificate Science, which she finds easy. There had been some overlap of space related content but this did not reduce her interest or curiosity about doing space topic at school. Lois explained why, "like there might be

things that I haven't learnt". Lois had demonstrated high prior knowledge in the preliminary brainstorm and the pre-test, in relation to the concepts tested. She expected to find the unit on space "very interesting" and "easy", these predictions being confirmed on the post test.

Analysis Tasks

The first task that Lois chose was Analysis 1, which is set out below.

ANALYSIS
Research two planets, one inner and one outer. Compare them in table form.
You may use the information from the planet fact file for one of the planets.

FIGURE 8.2: The Task Card for Analysis 1

Lois commenced this task on Day 3 using five different books, from which she copied selected information producing two full pages of output on each planet (Appendix 7, pp. 465-466). Each page contained nine lines of written text and a diagram. She firstly summarised the main points of comparison into a table (nine lines) as required, spending nine minutes of the first half-hour referring to and copying from the text book while chatting to others around her. Lois wrote about Mercury and Pluto comparing them in terms of temperature in relation to their distances from the sun. Lois explained that she selected Analysis 1 because "um like I like to find more information about the planets".

Lois was able to use the index sections of the books she had selected hence quickly found the information she needed. She was clear in her liking of this type of work, which possibly explains why she chose to do it first. The second interviewer also asked Lois on another occasion what activities did she like the best. Lois said "everything", and space was "my best topic" of all topics studied this year because "I like scientific stuff". She also explained that, "I like reading books and finding facts".

Lois had indicated in both the ESM data and interviews that she felt happy, interested, curious, excited most of the time during the space topic. It appears that Lois has formulated her own mastery goal (Ames, 1992). This is based on her articulated rationale for maintaining her interest in a topic which she knows quite well already and which she also studies after school.

Lois eliminated Analysis 2 below, because "it seemed like boring".'

ANALYSIS
Make up a profile of a person wanting to live on a moon colony. Be sure you give him/her the qualifications he/she may need.

FIGURE 8.3: The Task Card for Analysis 2

I: So what would be boring about that?
L: Like I already know what they need.
I: What the qualifications?
L: Yes

Lois has indicated that her prediction that it would be boring was because she already knew the answer. Lois also added that it would be boring because it was not specifically about planets. In this case boring appears to correlate with information already known and the mastery goal achieved.

Evaluation Tasks

From this category Lois had to choose three out of four options. She first chose Evaluation 2, "Do you think it's fair to use animals in space research and travel? Explain why you think this". Lois chose her evaluation tasks by selecting "um the ones that I think will be fun and the ones that I know a bit". In this case Lois has indicated that "know a bit" correlates with "fun". This first task asked for their opinions on the matter of animals in scientific experiments and travel in space. Lois appeared to have an informed opinion, in that she brought in the inappropriateness of human experimentation in her answer as well as an interesting anecdote. With minimal reference to resources, Lois completed this first evaluation task on Day 4 using the final 15 minutes of the session during which she was fully engaged throughout. She wrote quickly and effortlessly completing 14 lines of neatly written text and an illustration.

I: .. fair to use animals in space did you have any strong feelings about that
L: Yeah like I said that we should use animals for experiments. It would unfair for them, but it's better than using humans.

In her preliminary brainstorm, Lois had indicated her knowledge of a rocket having been sent to space, which "never came back so they sent a dog out there". This was the "bit" she already

knew. Lois used a text-book to find out the name of the dog which was "Lemonchick", and which she included in her answer along with an illustration.

The other evaluation tasks selected and completed by Lois are set out below.

EVALUATION
Choose a planet you would like to visit and say why.

FIGURE 8.4: The Task Card for Evaluation 1

Lois chose Earth including some facts, which she had also used in other answers. In this way she demonstrated good time management and the skill of generalising information across different types of stimuli. Her third evaluation choice was Evaluation 3, set out below.

EVALUATION
What would be the advantages and disadvantages of living in space?

FIGURE 8.5: The Task Card for Evaluation 3

Lois set this out as listed bullet points paraphrasing and summarising a range of facts from the whole range of tasks completed.

These three evaluation tasks selected were similar in that they required the child to express her individual opinion, which would be better answered the more informed the child was. In contrast to the Analysis 2 task above, these tasks equated existing knowledge with "fun". Analysis 2 had been eliminated on the basis that existing knowledge equated with "boring".

The evaluation task eliminated by Lois was Evaluation 4, which asked, "What would be the advantages and disadvantages of using robots in place of astronauts to explore space?" This task also required a table of comparisons. Lois eliminated this task because "um it would take a long time and yeah I already like know heaps about it" In this explanation Lois has referred to "heaps" that she already knows about the concept. In this case Lois did not describe it as "boring" but introduced time as a factor. In this decision, Lois appeared to be aware of the anticipated time investment. This might reflect a performance goal orientation due to having to complete 16 tasks. She did not immediately refer to the task as boring, but she did indicate that she already knew "heaps" about robots. During other times in interview Lois has indicated that repetition of information she already knows contributes to her feeling bored.

Knowledge Tasks

Lois was allocated three tasks out of the four. She completed Knowledge 1 which was the comparison between the astronaut and the astronomer and commenced Knowledge 3 which was to name some of the spacecraft that have travelled to space setting it out in a chart form.

I: So how did you choose which ones to do which one weren't you going to do?
L: That one (Sea of Tranquillity task).
I: So how did you choose not to do that one and to do the other ones?
L: Um I just chose things that I think I'll enjoy.
I: The things that you think you'll enjoy ok and you didn't think you'd enjoy the Sea of Tranquillity that much?
I: Right so what would you not enjoy about that that you would enjoy in the others?
L: Um it's just that I don't like like I don't like labelling stuff about the moon.

Lois appears to be clear in her reasoning that she would choose on the basis of anticipated enjoyment. Having eliminated one task on the basis that she does not like labelling stuff about the moon, Lois had not commenced her third choice which was the Space Encyclopaedia task by the time the unit had finished, "because like um it would take a long time". As with the evaluation task eliminated Lois also mentioned the time factor. She also said "sometimes um like people they don't like doing um like long stuff". The reasons for duration of tasks as a factor were not clarified at the time. Based on her work load expectations and the classroom performance goal orientation (Ames, 1992), tasks which take too long might slow down the progress towards the goal of completion of all tasks.

Comprehension Tasks

Lois was allocated two tasks out of the three options. She selected Comprehension 3, which was to explain why the Earth is different to other planets (done also by Dion and Abby), and "Comprehension 1, Describe what living in space is like for astronauts today. You could write this as an astronaut's diary".

I: Right so what attracted you about those two?
L: Um finding about facts.
I: Finding about facts.
L: And I also like writing diaries. I like writing stories this was the one that I had to do

As with her first task chosen, Analysis 1, Lois has indicated that finding facts was an attraction for this task. She also likes writing stories and diaries.

I: Right ok and you didn't choose the number two task about a word search?
L: No.
I: So what made you not choose that one?
L: It would take too long.

Lois thought that the word search task would take too long. This was in contrast to Abby who had thought it would be "nice and quick and easy". Lois had better vocabulary skills according to the PAT (Reid & Elley, 1991) data while Abby's score of 9 demonstrated poor skills in this area.

Application Tasks

Lois had two of these to do and chose to do all of them.

Lois's Cognitive Appraisals

As demonstrated in the interview data above, Lois used a range of cognitive appraisals (Lazarus, 1991) when faced with the range of task stimuli. Lois used several categories when determining selection or elimination of tasks. Her criteria for elimination have included:

Boring, already knew it, know heaps about it, take a long time, take too long, don't like labelling (mode) stuff about the moon (content).

Task selection criteria have included; I think I'll enjoy, I like finding facts (twice) I like reading (mode), knowing a bit, fun.

These descriptors include several opposites, which demonstrate a consistency in how Lois uses her existing schemata (Ellis, Varner & Becker, 1993) for categorising tasks for either selection or elimination. Her cognitive appraisals (Lazarus, 1991) reflect this consistency. For example, boring predicts elimination while fun predicts selection. "Like" predicts selection whereas "not like(ing)" predicts elimination. Lois has not used categories of hard versus easy, but she has eliminated two tasks on the basis that they would take a long time or too long.

Lois's Motivation or Goal Orientation

It has been argued that in the absence of any evaluation criteria a classroom performance goal orientation (Ames, 1992) has been implied. Lois had eliminated two tasks on the basis of their predicted time investment. Spending longer on tasks would reduce the number of tasks that could be completed in the time frame.

Lois has also indicated a mastery goal orientation. Her extra curricular School Certificate study of science has not reduced her interest or curiosity about space topic at school. There has been some overlap of content, but as Lois explained "like there might be things that I haven't learnt". Existing knowledge has been a factor in her selection process. Knowing "heaps" about a topic, or facts she already "knew" were levels of existing knowledge that predicted elimination of tasks. In contrast, knowing "a bit" was a reason for her selection of the three evaluation tasks.

The evaluation tasks allowed her to express her opinion. In these tasks Lois used her existing knowledge and found the tasks fun as opposed to boring. These tasks required the skill of generalisation of known information in conjunction with her opinion. Lois was also able to look up some new information which she also likes doing. For example, Lois had already known of the incident in which a dog had died in space through lack of oxygen. In addition to finding and integrating new facts such as the dog's name being Lemonchick, with her existing knowledge, generalising and applying known information is a "new" experience of known facts. This would be consistent with a mastery goal orientation.

Lois has explained her high interest in the human body and her long-term goal of being a surgeon. Sometimes Lois gets annoyed at missing school work because of violin lessons. Even so she explained that because she was open to a possible future option in music, she will engage in piano practise.

L: Well like sometimes if you get stressed and nervous and that like you sort of don't want to do it.
I: Right.
L: Yeah and but like I think that if I still do it I might like I will I might have a good future.
L: Yeah like even though I don't um sometimes I don't want to do piano lessons like um who knows I might become a pianist when I grow up or something like that yeah.

Her phrasing "who knows?" demonstrates an openness as to changing relevance and goals. It suggests that even if a specific goal has not been articulated at this time, it might be later on. Her reason for being excited during space topic was similarly stated, "Who knows what we might do like when we watch a video?"

The data presented thus far suggest that Lois has both performance and mastery goal orientations. At different decision points one or other might predominate. By Day 7 Lois attempted to re-negotiate the performance goal which she had decided was unfair.

Interactions with the Teacher

Lois said that she often functioned as an assistant to the teacher, which enhanced her status. Lois was even co-opted by the teacher for marking the work of other children in the class. During whole class discussions Lois engaged the teacher at a high rate. For example, during the 22-minute mat session on Day 4 (Chapter Six) Lois raised her hand on 18 occasions and obtained the opportunity to respond verbally to teacher questions about facts on 10 of these. This rate of successfully obtaining the opportunity to demonstrate her facts knowledge in a whole class context amounted to 55% of her attempts. Lois's 10 utterances amounted to twice the rate of Joseph's 5 utterances. Joseph had raised his hand on 5 occasions achieving a 100% success rate for seeking verbal engagement with the teacher. Dion raised his hand twice without any success, while Abby did not raise her hand at all. Lois would rather not spend time on the mat preferring to get on with her work, but she uses these sessions to support her mastery goals. Lois explained, "I get annoyed (about having to sit down on the mat rather than do work) but like if she asks questions on the mat it will good for me (and) I'm curious to answer".

Due to her high rate of utterances of facts, Lois received confirmation of her factual knowledge, positive social attention and praise from the teacher in a whole class setting, on many occasions throughout the unit. These consequences have reinforced her behaviour of finding facts and displaying her knowledge in a whole class setting. On other occasions Lois has demonstrated her knowledge of facts on an individual basis. For example, on Day 3 Lois showed the teacher her completed Analysis 1 task for which the teacher praised her specifically for having found and written the interesting facts. The teacher said "What you've got there is really good". The high rate of teacher attention and praise as a consequence of Lois demonstrating her facts knowledge

appears to reinforce her fact finding behaviour which might explain why this is an activity she "likes".

Lois has said she likes reading books and finding facts. Lois was able to read quickly in order to identify the relevant facts, which she then copied exactly from the text-book. While she might not copy a full paragraph she did copy exact sentences selected from different pages. The teacher appeared to be aware of this possibility as half an hour after commending the facts written by Lois above, she sounded doubtful as she asked "are you writing these in your own words?" about the next material Lois was writing. Lois then erased some of her written work. Lois appears to adapt her approaches to written tasks depending on whether she is writing facts or expressing her opinion, both of which she engage without hesitation.

Lois's Emotion Correlates

Lois has indicated that she loves school. She said that she likes school better than home sometimes, because of the time pressure she is under. To fit in her extra-curricular timetable her extra-curricular teachers come to her house in most cases. Lois has little time to relax. Her music teacher has high expectations of her, which at times is associated with nervousness and stress. She likes to give 100% in everything and is in "highest" group for swimming.

Topic work that she had felt most proud of, was identified by Lois flicking through her book saying, "um Mrs. L said that one and this one and this one". Teacher feedback appeared to be a factor, suggesting that she had felt proud because of the teacher's comments rather than her own opinion. This differed from Abby and Dion in that they had felt proud on the basis of their own perceptions of their output in relation to their effort. The teacher's written feedback in the book included a suggestion that she should get her story published. Lois was not proud of work which, "I could have done better, I could have found more information about it". Other examples of when she has felt proud was when she "got 100% right on my work (which) happens a lot". Achieving at this rate correlates with feeling happy, which in turn correlates with confirmation of her being correct. Not finding enough facts correlated with not being proud of her output.

Teacher feedback appeared to be important in her feeling of pride. Lois said she likes to use every opportunity such as mat times to demonstrate her facts knowledge to the teacher. She feels excited when raising her hand to respond to the teacher, and disappointed when the teacher asks

someone else, despite her having demonstrated the highest rate of public interaction with the teacher.

Lois has indicated that fun and boring are relevant criteria in the selection process. Lois has further defined fun and happy:

L: Well happy the topic's fun, so I get all excited, and happy and excited are the same thing

Lois has eliminated two tasks on the basis of boring. Lois has said to different interviewers that she doesn't get bored. When she does get bored she usually reads books. This suggests that she is able to anticipate boredom and prevent it by reading. In the space topic situation she also avoided boredom by eliminating potentially boring tasks. Although Lois has said she does not get bored, she has cited events of boredom. Examples of boredom for her include: "If the teacher gave us a boring topic like things I already learnt"; "waiting for the next activity"; "when the teacher repeats stuff;" "when we do things I don't like"

In boring situations Lois said that she is prepared to do boring work if she has to and it's the only choice "but like I try to do my best even though it seems boring". She was aware that other children in the class change their timetable if they're bored, but she believes she shouldn't, "like I can but like I don't want to skip the one so even though it seems boring I still do it". She generally finishes all work set although she might not finish a task "if there was nothing to choose if everything seems boring and if I don't feel like doing it". Lois finds it really easy to learn if she's interested.

Individual versus Social Context

Lois prefers to work individually. When working individually Lois was focused on her work and was fully engaged, for example she completed both the Comprehension 3 and Knowledge 1 tasks in a single 43-minute session working entirely on her own on Day 6, despite being distracted by the computer noise. She had complained to the teacher about the noise, which she found "quite annoying". During interview Lois confirmed that she manages to stay focused because, "I just don't care about anybody I just care about my work". She would rather get on with her work and gets annoyed if the teacher is reading a book to the class. Even though she likes books, she would rather do some more work. Her preference for working reflects both mastery and performance

goals. She had more tasks to do than most of the others in the class, and she wanted to achieve well.

When working in a group her preference was to work with Kellie, Harry or Joseph, "cos they like work" and she feels relaxed in these situations. Lois explained that "because um like if you work with someone who doesn't like working you mostly do all the work for them", which might cause her to feel annoyed or angry. Generally she does not like working with boys, because they are "not sensible enough".

Lois frequently assisted other new Korean children in the class. She sometimes got annoyed or angry when she was trying to find out her own information and other children interrupted her for help as a knowledge consultant. She has even occasionally repaired broken toys, which have been brought into the classroom against teacher instructions. As Lois explained:

L: Um sort of sometimes I get annoyed, cos like there are other people who can fix things not just me.
I: So you kind of don't want to always be the one that they go to?
L: Yeah.
I: And what do you think they're thinking and feeling about you?
L: They're just thinking that I can do everything but I can't do everything.

It appears that her consultancy status might be a burden at times. Lois occasionally joins in unrelated social dialogue. She is able to converse with others about unrelated content whilst continuing with her written tasks. During the 9-day unit on space there was only one session during which she interacted with other children about unrelated content in preference to task engagement. This occurred on Day 8 (Chapter Six), which was the day following her complaint to the teacher on Day 7 (coming up in Chapter Nine) that the amount of work expected of her was "unfair".

Lois's Choices Summarised

Lois chose tasks on the basis of anticipated enjoyment, anticipated fun, and some tasks in which she could incorporate "a bit" of existing knowledge. She likes scientific stuff, reading books and finding facts, these latter two modes of engagement being required for the majority of the tasks. Fact-finding has been a source of reinforcement for Lois in the classroom. Her reporting of happy, interested, excited and curious on each day of the on-line ESM data is consistent with her explanations for choosing tasks and subsequent engagement. Evidence presented in this section

demonstrates the previous successful conditioning of positive emotions with school experiences. Lois loves school and has a mastery goal orientation of being open to learning new things she has not learnt before, across a range of activities. Her enjoyment of both the mode and content of classroom tasks predisposes her to task engagement. Lois is able to engage in tasks in both the individual and group context, which increases her options. She appears to prefer to get on with her work in the individual context where she is able to complete her work more quickly.

Lois eliminated tasks which she did not like, these correlating with taking too long, already having a substantial knowledge and boring. In contrast to Abby and Dion, Lois did not have a hard versus easy category. Her first criterion was choosing for enjoyment. Easy was equated with being interested in learning. Lois also explained that "learning if you're bored is sort of hard cos you're trying to force yourself to listen to the teacher". In this context "hard" was not in relation to facts, but to maintaining attention. Being a School Certificate level student of science at 10 years of age indicates that Lois does not avoid intellectual challenges. In her maths she has asked the teacher for harder work to do.

While mastery and performance goals have been implicated in her selection process, Lois has used emotion-related terminology to explain her categorisation of tasks. While she has articulated clearly defined goals for herself in interview, her first criteria were enjoyment versus boring. For Lois it may be more than a happy coincidence that what she enjoys is what the teacher wants her to do. It appears to be the result of her emotional conditioning history, which has successfully paired positive emotions with reinforcement of engagement in routine classroom learning tasks and processes. Importantly, positive emotions have also become conditioned with reading and writing modes of interacting with new information, which is a useful resource to have as a learner in the classroom. This is in marked contrast to Dion who experiences stress when having to write about new information. The space tasks in the majority required these modes for successful engagement. Irrespective of her mastery or performance or long term goals, Lois has chosen on the basis of enjoyment.

Joseph

Joseph demonstrated prior knowledge in both the preliminary brainstorm and in the pre-test. He explained to one interviewer that he has "done space...like lots of times", perhaps three times before. He expected to learn "some more stuff, cause when I did it I was younger so didn't do as

much stuff." His pre-test data indicated that he expected to find the topic very easy to understand and did so. He expected it to be "a little bit interesting" and found it "very interesting". During interview he explained his expectation that it was "gonna be fun and stuff like that yeah".

Joseph was allocated 16 tasks, the same number as Lois. Joseph had explained that this was because, "I'm quite smart and I can do things quickly" (Chapter Six). On Day 2, when the teacher had completed this whole class allocation of tasks, Joseph and those around him (except for Abby who was excluded) compared their totals and appeared to congratulate themselves on having more of some categories than others. Joseph's final output was seven out of the 16 tasks. Following the instruction phase on Day 2, Joseph and Harry immediately made their way to the computer suite and spent 30 minutes perusing the Enchanted Learning website. Computer activities and games are Joseph's favourite activity about which he feels excited and happy. During their 30 minutes at the computer, Joseph and Harry scrolled through the website, making 27 stops to look at topics such as the sun, the sequence of the planets, a person's weight and age on each of the planets, the stars, the milky way, and the death of stars. Joseph was fully engaged with this while Harry became distracted from time to time.

Upon returning to the classroom, Joseph made his selections under most of the categories over a 5-minute time frame. He did this by circling the numbers of selected tasks on his contract sheet.

Synthesis

Joseph was allocated three Synthesis tasks and completed three. The task he commenced first was Synthesis 3, which is set out below.

SYNTHESIS 3
Design a space city. Consider human needs.
Think about houses, food, transport etc. *colourful illustration*
In corner of card

FIGURE 8.6: The Task Card for Synthesis 3

I: So what sort of things did you have to think about there?
J: Um they needed air to breathe and food water where did I put water oh yeah and I had a little nature place so that achieves inaudible carbon dioxide of the air.
I: Right and was that the first synthesis one you got on to?
J: Yeah.

I: And you chose that first because?
J: Oh it just looked fun.

Joseph completed this task without any reference to resources, in an individual capacity, interspersed with minimal non-content dialogue with Nora. From the brainstorm data, Joseph had existing knowledge that spacecraft have to have oxygen, and that there was no air and no gravity in space. He drew a large diagram labelling different components, occasionally talking to himself and occasionally consulting with Harry. While this was the first task selected from the board, it was not his first space related activity. He had commenced this task five minutes after returning from the computer. His prior 30 minutes on the computer viewing the Enchanted Learning website contributed to his feeling happy simultaneously with rehearsing or increasing his existing knowledge in his short-term memory (Nuthall & Alton-Lee, 1997). In addition, Joseph finds it more interesting when things are fun and tasks are quicker to complete.

Joseph self-evaluated during the task that it was a good space station. He then checked with Nora, "Do you think that's good enough for a space station?" When she indicated yes, he said "good" and then checked with Harry. He also made a point of showing his design to other children accompanied with laughter, and then to the teacher who suggested that he think about what he needs. Having then studied his diagram for a further minute he said to himself, "actually....I'll make that air", erased some writing and rewrote in his book. Joseph told the second interviewer that he thought he had done the design "pretty well except for (pointing) that used to be the fuel and that was a bad idea cause if there was one spark, the whole thing would have gone up so I put the fuel down there". He had then labelled the largest tank in his design as "air".

These explanations from Joseph suggest that he had both mastery and performance goals (Ames, 1992) in his awareness. His cognitive appraisal that "this looks fun" has incorporated the time factor "quicker to do things" which assists towards the classroom performance goal of having to complete a number of allocated tasks. His interest in what he was doing and requests for feedback suggest his desire to perform the task well, consistent with a mastery goal orientation. Joseph's interactions with peers were usually positive (apart from with Abby, with whom he has a specific history) and he likes to chat to "spicen" up the work atmosphere. Therefore the social interactions as a vehicle for obtaining feedback also enhanced the experience of fun. This task was completed by the end of the session having taken him 20 minutes.

Comprehension 3

At the commencement of the session on the following day - Day 3, Joseph completed his answer to Comprehension 3 as to why the earth is different to other planets.

> J: I'll read it out (reads). The world is different from all the other planets cos the world has seventy percent water it actually has water it has life forms and man made things TV and computer It has plants air and gravity. Other planets have gravity too. It has birds fishes animals and mammals, it has trees and the best temperature

Joseph had indicated one item of relevant knowledge on the preliminary brainstorm "the world has the only life form". Joseph consistently used the term "world" instead of "Earth", throughout all tasks. Joseph explained his selection criteria for this task.

> J: Yeah I just saw it and then I thought (pause) I'll do this and then probably I'll be able to do another one because this one's will be a nice and quick one.
> I: Nice and quick.
> J: Yeah.
> I: Did you have to look much up for that?
> J: Not much at all.

Joseph already had what he perceived as the prerequisite knowledge for this task. He had explained to a second interviewer, that he had found this task "actually quite easy cos I've done space the topic like lots of times". Joseph completed this task without reference to any resources. During this uninterrupted time, Joseph wrote eight lines of text. Joseph's cognitive appraisal (Lazarus, 1991) was "I'll do this", and included his anticipation that it would be "nice and quick", which meant that he could then do a further task. This suggests a firm decision based on a performance goal orientation (Ames, 1992). The process undergone at the start of this session differed from the previous day in that he did not overtly state fun as a variable in this decision although unconsciously he has associated fun with being quick. The circumstances differed on Day 3 in that this task was commenced at the start of a 60-minute session.

Joseph completed this task within 5 minutes of commencement of the session following which he went on to complete 3 further tasks. His next task was Evaluation 1.

Evaluation

Joseph had three evaluation tasks to do and he chose Evaluation 1 first. This was the task asking if the children thought it was fair to use animals in space research and travel.

I: So did you have to look up much for that?
J: No not really cos it is unfair that most of the animals that they sent up died though.
I: Oh.
J: That's sad (laughs).

Joseph took four minutes to complete five lines of text, interspersed with his attention being drawn to other activities around him. He appeared to be thinking about his response, reading it over before finalising it. Joseph told the second interviewer how he thought it was "cruelness" to send animals out into space and in response to being asked if he had read anything about this issue Joseph said, "I couldn't find anything". However apart from the time he had spent on the computer the previous day, and perusing the wall displays, Joseph had not referred to any resources for the tasks completed over Days 2 and 3. Following completion of this task, Joseph immediately progressed to his next task of Analysis 4.

Analysis

Joseph had been allocated three analysis tasks to do. He eliminated Analysis 2, which asked for a profile of a person wanting to live on a moon colony. Joseph explained, "well that one looked a bit boring". Boring was also one of Lois's criteria for eliminating this task. The only task in this category that he completed was Analysis 4, which is set out below.

ANALYSIS

Is the sun a planet? Explain

Give four reasons to show why the sun is important to life on Earth.

picture of sun with sunglasses on included

FIGURE 8.7: The Task Card for Analysis 4

This task also took just five minutes to complete six lines of text, interspersed with chatting to Kane. Joseph read out in interview.

J: Ah what I did number four didn't I um yes on number four I looked back at some um in the book was I just did one first laughs.
(Reads) The sun is not a planet it is a star clears throat and there are only 9 planets in the solar system. The world needs sun because it's light and heat to make planets grow no plants grow and makes the water cycle work. The sun pulls the water into the clouds and make rain and all that stuff.
I: Did you know that beforehand or did you learn it?
J: I knew that beforehand yeah.
I: Ok in a way you didn't need to look much up for that?
J: No.

Joseph had read about the sun on the Enchanted Learning website the previous day and he had already demonstrated in the preliminary brainstorm that he knew there were nine planets. Joseph also has a poster of the planets in their hallway at home so he looks at it every day.

The session on Day 3 had commenced at 1.36pm. Having completed a total written output of three-quarters of a page of text on three different topics, it was now 1.54pm. In these 18 minutes Joseph had been fully engaged in writing for 14 minutes. He then reviewed his work briefly before selecting Synthesis 4 as his next task.

Synthesis

Joseph commenced Synthesis 4 at 1.55pm on Day 3 having completed the above 3 tasks namely Comprehension 3, Evaluation 1 and Analysis 4. Total time fully engaged in these written tasks was14 of the preceding 18 minutes. Synthesis 4 is set out below.

SYNTHESIS 4
Write your own science fiction story about space. Put yourself in the adventure.

FIGURE 8.8: The Task Card for Synthesis 4

Joseph spent 28 minutes writing his story during which time he was fully engaged and completed almost two pages of text. This was the task about which he felt particularly proud and which generated the most fun. He spoke at length about it with the interviewer.

I: Tell me about writing the story. What was that like?
J Oh it was fun (he emphasises has the most expression of any time saying fun throughout both interviews and laughs). Cos you know when I wrote the story I felt

weird I was just going I just kept on making it up as I go and I think that that makes the story more interesting.

I: Yeah and so with the story. Like out of all the tasks, which task took the longest to do out of all the tasks for this topic?

J: Probably the story cos it's sort of you can probably tell because the story's like inaudible ? it's sort of like the longest.

I: And what was it like well how did the time go when you were writing that story? I mean did you cos you might have been writing for about half an hour.

J: Yeah or forty-five minutes. I don't know or something like that.

I: Was it tiring writing for that length of time?

J: Ah no not really cos like if it's fun you like writing.

I: Whereas you haven't written quite as much for the other things as you wrote for the story.

J: Yeah cos the story was fun laughs.

I: Could you have written more for the others if you'd wanted to?

J: Um some of them I couldn't have cos there wasn't any more facts you could do.

Watching himself on video as he engaged in this task, Joseph said that he would have been feeling "just interested, just thinking". Aspects of the story about which he was proud included "how cool it was", "how exciting it was", and when he was actually writing it he was thinking to himself, "oh just oh this is a funny story yeah and just was laughing in my head to myself".

In this discussion Joseph has introduced the notion that he is able to create more interest value in his story by letting his ideas flow. It felt a bit "weird" which was not clarified during interview. Joseph appears to be describing flow experience (Csikszentmihalyi, 1975). Interest appears to be a further variable, which has occurred in the presence of more intense fun than previous tasks. This was the task of which he was most proud and during which he had most fun. He has also experienced "cool", and "excited", in this context. Having completed his story, Joseph spent a further 15 minutes sharing this story with other children including Dion, which generated noisy laughter and opinions.

In contrast to this Joseph had eliminated Analysis 2 on the basis of predicted boredom. The interviewer asked, "What's it like when you're interested compared to when you're bored?"

J: um when I'm interested it's fun it's I like learning the stuff and that's interesting
I don't like learning about stuff that's not

The third synthesis task selected was Synthesis 1, which was to read some poems and compose your own. His poem reflected an interest in the environment and the 24 hours taken by the world to spin around.

Comprehension 2

As discussed above Joseph chose Comprehension 3 as his first task on Day 3. The second task selected was Comprehension 2 the Word Search. He chose this task, "um probably because um this one I like the word finds yeah". He eliminated Comprehension 1 which was the astronaut's diary task, "um probably because I wasn't interested (laughs)". Joseph explained that even though he predicts a task will be fun he does not necessarily verbally categorise it as such.

J: That's probably cos I just saw that one and just did it cos normally on ones where I know there's two good ones, I just I probably just normally I just get one of them. Yeah I don't really go oh that one's more fun. I just go - I'll do that one.
I: You saw that and thought right I'll do that one?
J: Yeah.

From this dialogue, it appears that Joseph's conscious cognitive appraisal (Lazarus, 1991) does not always firstly relate to fun, rather it relates to his conscious decision to "do it". He was unable to specify a mood or emotion correlate he would be feeling, "any mood cos they were quite fun ones yeah".

Application

Joseph had two tasks in this category. He chose Application 2, which was to make a model of a creature from outer space using plasticine, and Application 3 to make a model of the solar system. Both tasks required a 3 dimensional outcome, and both were completed.

J: Oh cos um they looked quite good one make a model that would be fun in plasticine. And make a model of the solar system that would be fun as well.
I: What do you think about making things? What makes that more appealing for people to choose?
J: Well it's more fun, but if you're making something like that *(clicked his fingers) well it's boring. But it's fun making something that takes time.
I: OK so if it's a bit like that * (when you clicked your fingers)* you mean like it would be really quick.
J: Yeah.
I: And that wouldn't be as good as doing something that takes a bit of time?
J: Yeah.

Joseph's rationale as to the importance of speed of task completion appeared to differ in this context. If making something were *too quick* it would be boring while taking time over the

making process would be fun. In these tasks, the mode of engagement appears to be the fun related variable.

Knowledge

Joseph had three knowledge tasks to do. He did not complete any of these tasks. On Day 2 he had circled three tasks on the following basis:

J: Oh they were they weren't too like real hard but they were in between they were quite good yeah.
J: Yeah and they give you lots of information.
I: Right and did you want to find some information?
J: Yeah

The selected tasks were "quite good", because they were "not like real hard". This implies an anticipated level of difficulty, which was not insurmountable. This categorisation did not predict task elimination, but did predict postponement. Joseph indicated that he wanted to find the information for these tasks yet he liked to do fun tasks first because they would be quicker and more interesting.

J: I do all the funs one first.
I: And what's important about the fun aspect of it do you think?
J: Um it's just making it quicker to do things and it's more interesting.

In comparison with the other tasks, Joseph explained how he decided to postpone the knowledge tasks:

J: Oh cos I looked at the other ones and they looked like fun yeah.
I: So they looked like what, when you say fun.
J: They looked funner than those ones.
I: More fun than those?
J: yeah those were probably - they would probably the next one I would have done if I'd had more time.

In this dialogue Joseph has indicated that the knowledge tasks were not predicted to be as much fun as tasks in the other categories. In comparison with the knowledge tasks, the other tasks were "funner". Funner tasks could be predicted to be quicker. Postponing the knowledge tasks suggests that Joseph expected them to take longer, but this postponement resulted in their elimination by default as time ran out. Joseph had eliminated Knowledge 4, which was the Space

Encyclopaedia because, "Oh I just didn't like it". As indicated above, fun and interested correlated with liking. Joseph was clear that he did not like and therefore was not interested in Knowledge 4.

Joseph's Cognitive Appraisals

Data presented above demonstrates that Joseph used a range of cognitive appraisals (Lazarus, 1991) when faced with making choices from a range of task stimuli. Joseph had a specific criterion or category in mind each time he perused a task. When faced with a range of options Joseph assessed them firstly in relation to his main category of fun. Within the fun category there were sub-categories of funner, fun, and fun. His specific goal was to do the fun tasks first hence he sought these out specifically. Tasks that did not fit the fun category were eliminated by default. This implied that Joseph's category for elimination of tasks was "not fun". Tasks were either going to be fun or not. Joseph tended to explain his selection process rather than his elimination process. This suggests that when perusing the task options, Joseph was expecting to choose rather than eliminate tasks. Elimination of tasks appeared to occur as the consequence of their not being selected, rather than Joseph consciously eliminating them.

Other criteria for selection included: nice and quick, weren't too like real hard but they were in between, they were quite good, or good ones.

Joseph had one further overt cognitive appraisal which was "I'll do that one". This decision was occasionally his first conscious response to tasks. Joseph speaks very quickly. His cognitive appraisals were also quick in that he was well practised in assessing the anticipated fun level of tasks resulting in a decision to "do that one". His expectation of fun in conjunction with his reading of tasks for their fun characteristics has been demonstrated in his comment about choosing tasks in general, "I do all the fun ones first".

Task elimination criteria included: looked a bit boring, and I just didn't like it.

Joseph's Emotion Correlates

Joseph's self-reports have provided the emotion correlates for his definition of fun, which was his main overt, conscious criterion for task selection. He had categorised a number of tasks as fun,

which resulted in his use of further criteria of "nice and quick" in order to decide which fun task to commence with.

Joseph experienced the most fun when he was writing his story, which was the fourth task he completed on Day 3 and during which, he appeared to be experiencing flow (Csikzentmihalyi, 1975). His explanation of his creative process in writing indicated that he perceived himself as creating an interesting product, which correlated with sustained engagement for 28 minutes. During this 28 minutes the time went quickly and it was not tiring writing for such a length of time "cos it's fun if you like writing". In this task, both the content and the mode of the story were sources of fun. Also he felt proud of his story because it was fun, cool and exciting. The story was also funny, generating much laughter and enjoyment when read by his peers. Joseph likes humour "cos you're happier, you're laughing and that makes you happy". He said, "yeah and um I've heard this thing that laughter is a medicine", and he finds that the effect of jokes will keep him working.

Joseph has explained that "when I'm interested it's fun it's I like learning the stuff and that's interesting I don't like learning about stuff that's not (interesting)". In this statement, Joseph appears to have located the responsibility for interest in two areas. "When I'm interested" suggests intrinsic interest (Hidi, 1990), which is consistent with his explanation of how using his own ideas making up the story as he wrote generated a more interesting story. "And that's interesting" suggests a situational interest (Hidi, 1990), in the "stuff" which he might or might not like to learn.

On the basis of this correlation between interest, fun and like, Joseph's elimination of the Knowledge 4 Task because he did not like it suggests a predicted absence of interest or fun.
Joseph has described different intensities of the fun experience, namely fun, funner and fun. Computer-related activities are his favourite and this correlates with feeling happy. Joseph's ESM data demonstrated that over the five days sampled, his emotion or mood states included happy, relaxed, interested and excited. This latter state related to working on the computer and lunch time. He believes that he learns best when he is relaxed. Joseph likes writing, which was a required mode for task engagement. His preferred mode of using the computer was the task he first engaged in prior to commencing his drawing of the Space City.

Negative emotions reported in relation to tasks not chosen were boring and not liking. Not liking a task correlates with not being interested and not fun.

Joseph's Motivation or Goal Orientation

Tasks which were fun, and which were selected and completed appeared to be those in which Joseph had existing knowledge. They were quick because he did not have to research any further information. In contrast the knowledge tasks which were postponed required research, hence would take longer to complete. These choices might reflect a performance goal orientation (Ames, 1992) in that Joseph wanted to progress through the tasks in order to finish them. His sustained task engagement for 42 minutes on Day 3 supports this argument. I asked him:

I: When you're doing a task what causes you to continue on with it?
J: Oh just if I start it I want to finish it because otherwise next time I do it it's like okaaay what was I doing yeah, cos if you do cos then you can't remember everything that you had before and then you have to go and look it up again.

In this dialogue Joseph has confirmed a performance goal orientation (Ames, 1992) for this task and perhaps for the session. His explanation also suggests good time management in that he prefers not to have to revisit a task at a later time otherwise he might not remember the material necessitating him to have to look it up again. However, as observed he did not do any research.

Joseph has also demonstrated a mastery goal orientation (Ames, 1992) in that he has checked with peers and with the teacher for feedback following which he has made alterations to his work, for example when designing the space city and writing his story. The teacher appears to have given specific feedback such as "think about what you need" in relation to the space city, and "proof-read" the story. Following teacher feedback Joseph has followed her advice. As has been demonstrated, peer responses to his work particularly his story, has been accompanied with interest, attention and laughter.

Joseph has stated his goal of doing the fun tasks first, and his strategy of "spicen(ing)" his task engagement through interaction with peers. Experiencing fun helps with ideas, although sometimes he "will work" and others he will "just have fun depending on whether I want to get much work done". These factors suggest that Joseph has multiple goals, which includes both academic and social goals (Wentzel, 1999). Multiple goals might be confirmed in Joseph's

explanation that he comes to school, "because I have to (laughs) no cos ..if you stay home too much it starts to get boring, school just speeds it up and you're with your friends and stuff like that so it's more fun". Being with friends is the best thing about school where time appears to go faster.

Individual versus Social Context

Joseph likes this classroom environment in which he appears to be able to combine social and academic goals. He is able to work both individually and in a group context. During space topic he completed most of his work in an individual capacity in the wider context of social interactions with peers. He appears to be able to interpret task requirements without needing assistance. On Day 7 he worked in parallel with Timothy whom he supported and encouraged. Joseph appears to be popular and is frequently consulted by peers. This reflects the class perception of him as smart and also funny. Social interactions as well as content related dialogue with peers were generally accompanied with laughter. He prefers to work with Harry, and they frequently take it upon themselves to offer Abby their negative opinions about her work output and standards. Joseph sits next to Abby and this proximity in conjunction with his negative social history with her, predisposes him to noticing her every behaviour.

Joseph seeks feedback from peers on a regular basis, although he is selective about who he asks. His concern about Abby's copying of his work and Mason's grumpiness precludes them from this process. Joseph explained why he showed his story to his peers.

J: Oh cos I was just seeing if they liked it or whether I should change it a bit or something.
I: And what did they think?
J: Oh they thought it was cool and I asked a couple of people and yeah

For Dion who had been interrupted after only 10 minutes of story writing, the interruption, laughing and distraction resulting from Joseph's story signalled the end of his story writing for the day. In the meantime Joseph used the peer feedback to improve and further edit his own story. In order to show his story to Dion, Joseph had to leave his seat and move across to the other side of the room. Joseph has actually criticised this aspect of his classroom telling the interviewer that, "people wander round too much". This has been a disadvantage to Joseph on occasions when people have interrupted him at times unsuitable to him. However, it was a feature he himself used

frequently by calling out to Harry or wandering around showing his work to others. Such a process requires a level of self-confidence about one's own competence and assumes that other children are interested in one's output.

Interactions with the Teacher

Joseph was able to interpret instructions and engage in tasks without extra assistance from the teacher. He showed his space city to the teacher at the same time as he showed his peers, with a sense of fun. He approached the teacher using the same tone of voice and laughing as to his peers, to which the teacher responded smilingly. Joseph was confident in being his fun-loving self in this context. In order to obtain her feedback Joseph initiated the conversation by catching the teacher's attention as she went past, and specifically showing her his work saying, "look at my space city." He responded to her advice to "think about what you need" resulting in his changing the location of the air supply. In this situation Joseph has ensured that the teacher has seen his work and he has obtained specific guidance for completion of the task.

Joseph was allocated the same number of tasks as Lois, which suggests that the teacher had similar expectations of both subjects. Joseph was appointed a leader in the group task on Day 9.

Joseph's Choices Summarised

Joseph chose tasks on the basis of anticipated fun, some tasks predicting more fun than others. He started with tasks, which would be nice and quick, not too hard, and quite good. Tasks were eliminated on the basis that they did not meet any fun criteria, they looked boring or he just didn't like them. Joseph completed only those tasks he had categorised as fun, these being completed without reference to any text-books. Writing is a mode that Joseph enjoys and writing his story was the most fun of all tasks. One aspect of the story that obtained positive social reactions from peers, was that it was funny. His space city also gained the same reaction although not to the same extent. Joseph enjoys humour. The positive reactions of other children appear to reinforce his creative drawing and writing behaviours. Joseph likes school where the time goes more quickly than home, which tends to be boring when the holidays go on for a long time.

Joseph has demonstrated multiple goals (Wentzel, 1999). Getting on with tasks which were nice and quick meant that he progressed through several tasks each session, consistent with

performance goals (Ames, 1992). Seeking and responding to feedback from peers and the teacher demonstrates a mastery goal (Ames, 1992) of achieving a quality output and the social goal (Wentzel, 1999) of peer attention and enjoyment of his humour. Time duration of tasks appears to be a factor dependent on task mode. For example, tasks requiring the written mode were selected on the basis that quick correlated with fun, while tasks which required physically making a model were fun if they took some time to complete. In other words if they were too quick they would not be fun or as good.

Joseph's emotional conditioning history has resulted in the pairing of happy, interested and fun with both the content and modes of task engagement required for the space topic tasks. His reported experience of already having "done" Space three times predisposed him to using his existing knowledge rather than spending time finding new information. While he said that he likes finding new information, this did not predict task engagement ahead of tasks categorised as fun. This suggests that reinforcement he has received and currently receives for engagement in fun tasks has outweighed reinforcement for finding new facts. Social reinforcement has accompanied teacher attention for his completion of the "funner" tasks, which he did first. Based on his reported preference for social interaction and humour, these increased the likelihood that he would engage in fun tasks first. These may well have been learning strategies.

While Joseph had not specifically eliminated the boring task or the task he did not like, he postponed these long enough to have legitimate reasons for not completing them – he had run out of time. He had completed two Application tasks, which would have taken more time than the "funner" and quicker written tasks. This was in contrast to Lois who left the Application tasks until last (and did not complete them) because she had not regarded them as important enough tasks. Irrespective of these factors, Joseph has selected his tasks from a range of options on the basis of fun.

Individual Similarities and Differences

From the evidence presented in the preceding sections it can be seen that irrespective of a range of individual differences, the four target children have stated similar criteria in situations of choosing tasks. Their selection criteria were evident in the first statement made by each target child in relation to their first tasks selected, as summarised in Table 8.1.

Table 8.1

First Statements Made by Four Target Children Indicating their Selection Criteria

Subject	First Categorisation
Dion	Cos they're fun
Abby	Cos it looked a bit easy
Lois	I like reading books and finding facts
Joseph	It just looked fun

The first responses made by the target children to the question as to why they chose their first tasks, provide the individual selection criteria of each child (Table 8.1). The conscious cognitive appraisals made by the individual children have demonstrated their broad categories or schemata (Ellis et al., 1993) under which, selection or elimination of tasks would occur. Within these schemata were contained the target children's self-beliefs and expectations.

Table 8.2

Summary of Task Selection and Elimination Criteria of the Four Target Children

	Task Selection Criteria		Task Elimination Criteria	
Subject	Cognition	Emotion Correlates	Cognition	Emotion Correlates
Dion	Easy I like drawing I like that Best for me	**Cool** **Happy** **Fun** **Interested**	Too hard (won't get finished) I don't know	**Anger** **Stress**
Abby	Nice, quick, easy Bit easy Looks easy Do all the good ones first I liked it	**Ok** **Happy** **Fun** **Relaxed** **Interested** **Not bored** **Proud**	Kind of hard	Not identified
Lois	The things I'll enjoy Know a bit I like finding facts	**Fun** **Happy** **Interested** **Curious** **Excited**	Take too long Already know heaps Knew it I don't like labelling	**Boring**
Joseph	Nice & quick Quite good I do all the fun ones first Not too hard In between Give information Not too quick (model)	**Fun** **Funner** **Fun** **Interested** **Happy** **Excited**	I just didn't like it I wasn't interested	Looked a bit **boring**

Table 8.2 has summarised the cognitive appraisals and emotion correlates of those tasks selected and eliminated by the four target children. Irrespective of the individual differences across a range of contexts, the four target children have used similar categories to determine what tasks they would select or eliminate. Dion and Abby used broad categories of easy versus hard. These two children had lower PAT scores across the board compared to Lois and Joseph. These categories appear to be well established. As a rule Dion avoids hard tasks and only does easy ones. Abby does all the good ones first, those that are easy or a bit easy, either avoiding or postponing the hard tasks.

Lois and Joseph did not use an easy versus hard measure. This perhaps reflects their experience of not needing to worry whether tasks are easy or hard. As higher achievers and "smart" (Chapter Six) they are in the privileged position being able choose tasks, knowing that they are smart and not having to prove it to anyone. The differences between these two pairs of children in terms of that category alone demonstrate at a basic level that it is much better to be smart and fast, than slow and not smart.

Lois used the broad categories of those that she thinks she "will enjoy" or not. Tasks that she will not enjoy are eliminated. Joseph does all the fun tasks first, postponing any tasks that do not fit within his fun categories of *fun*, funner and fun. Joseph was excited about working on the computer, while Lois was excited because the topic was fun and "happy and excited are the same thing".

In each case, when the immediate cognitive appraisal was "fun", the target children selected and proceeded to engage in the task. While Lois and Joseph did not have a "boring" category as such, they both used the descriptor of boring in their explanations as to how the tasks which were eliminated had *not* met the criteria for enjoyment or fun. Lois and Joseph defined fun in relation to interest. Dion and Abby correlated fun with easy. Abby, Lois and Joseph had indicated interest in the mood experience sampling data. Abby and Dion both indicated later in the interview process that they had found space interesting. As will be argued later in the discussion, this suggest that anticipating a task as "fun" indicates that it is also interesting. In addition it indicates that the task is achievable within the constraints of the teacher's expectations. In this case each child knew they could get it done. This suggests that Brophy (1999) should not to worry about this term being used in motivation discussions. Hearing that a task appears to be fun or not provides the preliminary diagnosis as to the child's capabilities in relation to the task, perhaps the

lower level of their ZPD. Depending on what skill the teacher might wish to scaffold, this level has been diagnosed with the broad category of fun. In this classroom situation, it was at this lower level of the ZPD that the children then had to consider the expected duration of the task. This was due to its main purpose of getting finished. However if there had been different criteria such as find something new that you did not know before, in conjunction with the appropriate scaffolding per child, each child could have moved through their individual ZPD in the skills or knowledge that they needed to develop in themselves.

As it was Joseph and Abby selected on the basis of "nice and quick", while Dion and Lois eliminated on the basis of taking too long. Joseph made an exception to the "nice and quick" criterion for application tasks of model making, where fun correlated with spending time on task.

Analysis of the data presented in this chapter has demonstrated that interest, fun and task duration were common to all four children. There were individual differences in which tasks constituted easy, hard, enjoyment, fun or boring, resulting in each child having chosen different tasks with varying quantities and quality of outputs. Comprehension 3 was the only task chosen and completed by all four children.

Individual Differences in Comprehension 3

Comprehension 3 "Explain why earth is different from other planets", was the only task completed by all four subjects. Abby flicked through several books following the teacher's encouragement to do some research. The other three target children approached this task without reference to any text resources, using only her/his existing knowledge and skills. Therefore this was the only task which met their shared criteria of interest, fun and not taking too long. There were individual differences in the length of time spent on this task by each of the target children as reported in Table 8.3.

Table 8.3

Time Spent and Outputs of the Four Target Children for Comprehension 3

Subject	Time Spent	Output
Dion	7.5 mins	4 lines
Abby	16 mins	2 lines, 1 table of comparisons with 10 facts / words illustrated
Lois	11 mins & 3 mins	16 lines of writing , diagram of Earth with continents
Joseph	5 mins	7 lines

Table 8.3 summarises the amount of time spent on the Comprehension 3 task by each of the subjects. Because Dion, Lois and Joseph invested no time in research, their time investment was solely in written task engagement. Abby wrote brief notes interspersed with flicking through books. There were individual differences in the quality and quantity of their individual output (Appendices 5, 7, 9, 10). Lois wrote a page including five facts discussed in depth and a statement about the importance of protecting the environment. Joseph included a statistic of the amount of water on Earth, a detailed fact about gravity and several superficial facts of what Earth has. Dion and Abby included basic facts at a superficial level of description. Abby included a fully illustrated border.

At the end of the previous chapter Dion's decision-making model proposed that his choices were adaptational encounters also being the result of cognition, emotion and motivation in relation to a range of classroom factors. The proposed model is summarised below in relation to the decisions presented in this chapter.

Summary of the Proposed Model

Figure 8.9 presents the template of the proposed model of decision-making.

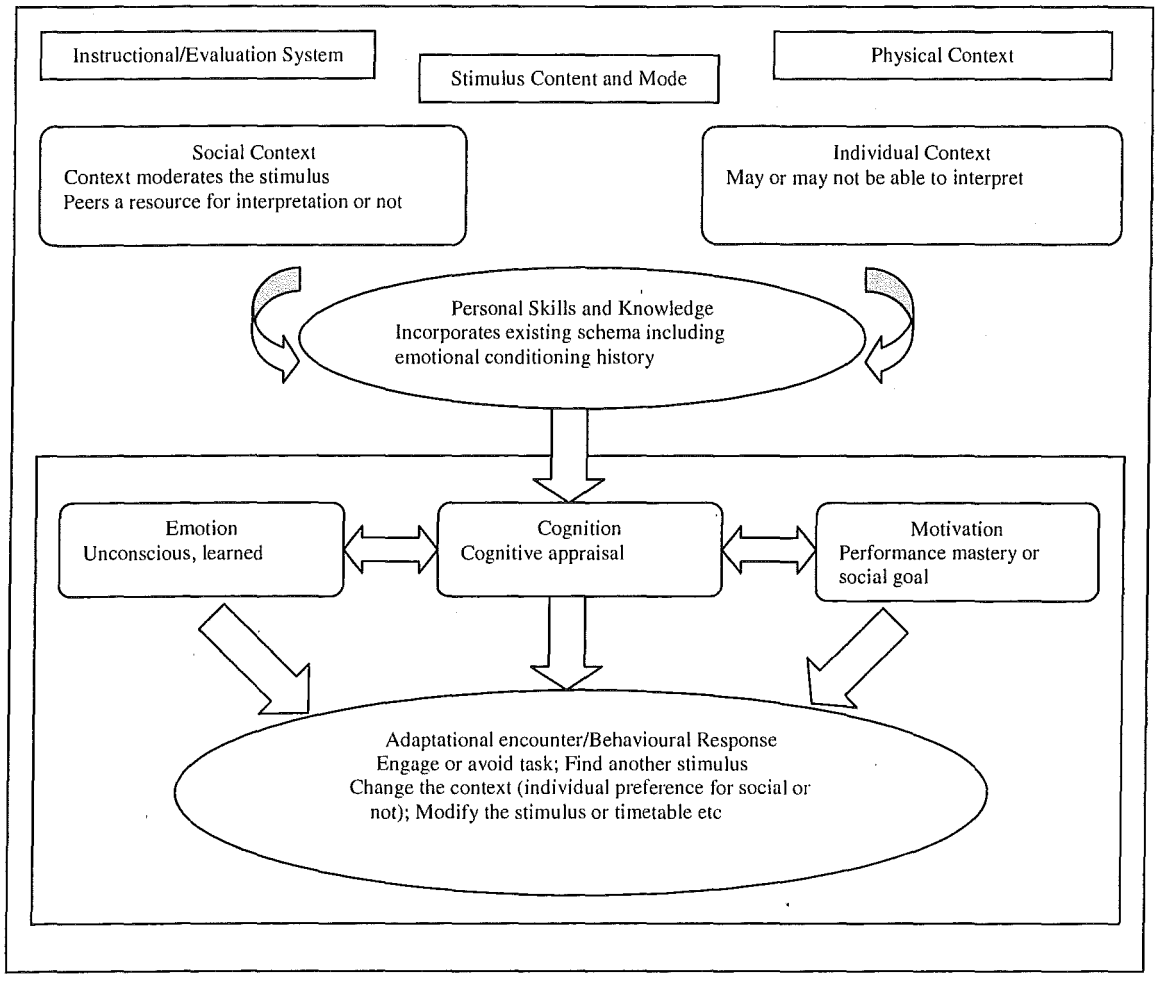

FIGURE 8.9: A Proposed Model of Decision-Making

Instruction Evaluation system (Figure 8.9)

The instruction-evaluation system (Nuthall, 1999) impacts perception of the stimulus through the teacher's instructions. This is also where goal orientation (Ames, 1992) is either clearly defined for the children or not. In the absence of specific evaluation criteria, this chapter has argued that a performance goal orientation (Ames, 1992) was implied. Individual differences in goal orientation were noted and these were incorporated within the individual subject's own personal skills and knowledge system. The teacher acknowledged the individual differences in children's skills and knowledge by allocating a set number of tasks for them individually. This also reflected her individual goal orientations for each of these children. This meant that across the class the children were all expected to complete their tasks, but because the teacher had already determined in her mind, each child's potential for achieving the tasks, she demonstrated higher expectations of the higher achievers compared to the lower achievers.

It seems that Joseph and Lois initiated interactions with the teacher, whereas Dion and Abby did not. When the teacher occasionally initiated interactions with the latter two children, they avoided interaction through their non-specific positive responses. For example, although the teacher praised Dion for being "good boy" (Chapter Seven), she commented to the observer that she did not think much work was being done. The instruction evaluation system was subject to alteration by the teacher or by the individual children, for example Abby changed task stimulus criteria such as the number of tasks she would do, herself.

The nature of teacher interactions has been shown to impact task selection for the two higher achieving children. Joseph has obtained guidance and reinforcement for asking for specific feedback on his work, which was accompanied by fun correlates. Lois has received teacher reinforcement for fact-finding, which is her favourite thing to do. Lois makes the most of every opportunity to elicit this reinforcement, enduring the annoyance of mat time by using the time to display her facts knowledge at a higher rate than the other children. Dion has avoided interacting with the teacher, thus obtaining no specific feedback on his work. Dion asks peers rather than the teacher for assistance. He does not know why, but he does feel happy with peers. Abby also did not receive specific feedback about her work. The teacher has reinforced Abby's listening behaviours in front of others. Abby listened at a high rate while making no utterances about space in a whole class context.

The Physical Context

Access to the tasks and resources impacts choice or task engagement time. Proximity to other children dictates social interactions with their accompanying happy or annoyed states. The autonomous timetabling arrangement provided the opportunity for children to change their timetable in an ad hoc manner when they might not feel like continuing on with a task. For example, Abby changed her timetable on one occasion and the time on her watch on another. Anticipated duration of the tasks was a factor, with speed of task completion having been overtly correlated with "smart" by Joseph, and also implied by Dion and Lois. We have seen that Lois has used several of the books available, whereas the other three children have used them less.

The Stimulus

In addition to the previous external or "delivery" aspects, stimulus structure, content and mode of the tasks have been shown to impact the target children's choices. Individual differences in the emotional conditioning history in relation to these features of the stimulus were demonstrated. For example, each of the four children expressed different preferences, such as art, finding facts, drawing, reading, writing stories and so on. This appeared to relate to which activities might be anticipated as fun to do. For example, mood-congruent memory (Mayer, McCormack, & Strong, 1995) of positive emotions may well have been stored with previous positive reinforcement of Lois's fact-finding behaviours contributing to her "liking" this process. She selected tasks that required this mode of responding.

Ideally, the four target children should have been motivated to research and find new facts, but this was not clarified for them as being the purpose of the tasks. As we have seen when they were asked to find an interesting new fact they all did so (Chapter Six). This confirms the importance of the instructional evaluation system. For example, Lois seems to have interpreted this requirement without being told. Alternatively perhaps it was just a coincidence that her preferred activity is what the teacher prefers them to do. Abby loves art hence included illustrations with her task responses. Joseph looks for fun in any tasks he undertakes based on his reinforcement history and enjoyment of humour. He 'likes" writing stories. Both Dion and Joseph have described experiencing flow (Csikszentmihalyi, 1975) whilst engaging in the tasks which had predicted the most fun – hence interest.

Social versus Individual Contexts

Children's preferences for either working individually or with others have been shown to correlate with their emotions and their choices. For example, Dion needed Rhys to assist in translating the stimulus for him and giving him the information for some answers. He feels happy working with Rhys and stressed when trying to think of ideas on his own. Lois gets annoyed when other children or the teacher prevent her from getting on with her work. However, on one occasion she engaged some of these annoying peers to talk about her favourite topic – the human body (Chapter Six). This event occurred on the day after she had tried to re-negotiate her performance goal of 16 tasks, because she felt it was "unfair". Joseph "spicens" up his task engagement by chatting to others while he works. He also makes sure that he obtains social

reinforcement for his humour, which he had incorporated into his task output. Abby works on her own by default. She gets on with her work in the absence of social dialogue and in the absence of verbal abuse and bullying which brings annoyance. Resources have been snatched from her preventing her from responding to the task requirements, yet she asserts her rights only quietly and mildly.

The Personal Skills and Knowledge System

The personal skills and knowledge (Nuthall, 1999) of the children includes her or his existing schemata and expectations (Ellis, Varner & Becker, 1993), and the three functions of the mind, emotion, cognition and motivation (Snow et al., 1996). The resultant behavioural response is the outcome of the intertwined nature of the three functions of the mind or adaptational encounter (Lazarus, 1991). The model takes account of these factors individually in order to demonstrate the role of emotion, and individual differences between subjects in situations of choice.

The model places the personal skills and knowledge of the individual child at the junction of the external stimulus and the internal processing. Within the individual child's own skills and knowledge systems the task was perceived, interpreted and either selected or eliminated. This chapter has demonstrated individual differences in motivation, emotion and cognition. There were individual differences in how existing knowledge impacted the selection of tasks. Tasks which Abby and Joseph had described as "nice and quick", were tasks for which they had enough existing knowledge to answer without looking up any information. This implies a performance goal orientation (Ames, 1992) for these tasks. Lois described tasks about which she knew "a bit" as fun, while boring tasks were those about which she already knew "heaps". This implies a mastery goal orientation based on Lois's interest in learning new facts. Dion experienced cool, happy and fun while engaging in Comprehension 3 for which he had existing knowledge and avoided or postponed tasks for which he would need to research. A number of individual differences in goal orientation were demonstrated, including performance and mastery goals (Ames, 1992) and social goals (Wentzel,1999).

Behavioural Response

This chapter has provided evidence of the range of responses to the task stimuli having dissected the processes of each of the four target children. Tasks were either selected or eliminated. Elimination of a task resulted in the seeking out of a new stimulus and commencing the decision-making process again. Occasionally elimination of a task predicted a change in context. For example, Abby changed her timetable or her watch to postpone the process. Dion postponed knowledge tasks until he was in a social context in order to proceed with task engagement.

Mode of responding appeared to be a factor. For example, Dion engaged verbally without stress as opposed to having to sit and write which predicted stress. Abby spent more time on the artistic additives to her work, art being preferred to writing. Lois enjoyed the mode of researching and basically copied facts into her book. Joseph had stated that he likes finding information yet he postponed any research until he had completed the funner tasks. Lois and Joseph were productive in their written work indicating that this common mode of required responding in the classroom is not a barrier to task engagement. Lois wrote more legibly and neatly, producing more quantity and a better quality of output. According to Joseph the mode of model-making was fun if it took longer, in comparison to written tasks needing to be nice and quick. Lois thought that tasks requiring a model-making mode were not as important as the written mode. Consistent with the findings of McPhail et al (2000), the modes of the target children's preferred domains were related to their interest and enjoyment.

Apart from Comprehension 3, which they all completed, the four target children chose different tasks in relation to their selection criteria (Table 8.2). It appears therefore that the individual differences in task selection relate to individual differences in what constitutes fun and its correlates, including interest. As has been argued previously the emotion system responds rapidly and unconsciously to stimuli (Goleman, 1995). This chapter has demonstrated that individual differences in emotional conditioning occur in any or all factors which impact decision-making and have been included in the proposed model (Figure 8.9). As demonstrated in this chapter any of these factors might predominate in any given example of situated responding. The salience or size of the impact will vary according to the individual target child's history within that context and in relation to the relevant variables at that time.

Discussion

This chapter has presented my fine-grained analysis of the series of decisions made by the four target children in Study 17 using my proposed model of decision-making (Figure 8.9). As I also found when analysing Dion's decision in the previous chapter, each of the choices made by the other three target children was an adaptational encounter (Lazarus, 1991). The immediate needs were similar, in responding to the imminent demands of the task, which was only one of a series of things to do, so that the first cognitive appraisal was to be able to get it done. The model of decision-making that I have proposed has demonstrated the impact of a range of factors through the individual skills and knowledge of the child to the framework of the three functions of the mind (Snow et al, 1996). There have been individual differences demonstrated as to which factors might predominate in different situations.

I have explained in detail the unique cognitive and emotional processes undergone by the four target children as they selected tasks from a range of options. I have traced their emotion correlates through their descriptions of their experiences. This has identified that - irrespective of their perceived abilities (achievement) and gender, and allowing for their unique attributions and explanations, the target children's choices were primarily correlated with fun or enjoyment, which also predicted interest. More specifically, for Lois the emotion correlates of choosing and fun included interested curious and excited (the Factor 2 emotions), and for Joseph - interested and excited. Dion and Abby had interested, but none of the other Factor 2 emotions. They all cited happy (Factor 3).

Anecdotally it might be instinctive for teachers and researchers to dismiss attributions made by children that tasks have been chosen on the basis of fun. But the data have shown that the term "fun" as used by the target children discussed in this chapter has been generic for a range of important variables including happy and interested. Having analysed the children's cognitive and emotional correlates of fun in this chapter, I have argued that the target children have been fully capable of articulating fun as the terminology of intrinsic motivation. This in turn has been entwined with their self-efficacy appraisals (Bandura, 1997) such as easy, knowing a bit, not too hard, and their internalised goal orientation (Ames, 1992) of taking too long, not finishing, already know it. In terms of Lazarus's (1991) adaptational encounter the anticipated emotion states associated with the experience of fun were relevant variables. Equally important for one of the children was the avoidance of anticipated aversive emotion or mood.

Although their emotions, attributions and motivations were similar, there were notable individual differences in both the quality and quantity of written work produced. This reflects the unique experience and skills of the four target children. The amount of time spent on each task also varied.

As with Dion in the previous chapter, the children's emotion correlates let us know how they are "getting along in their world" (Lazarus, 1991, p. 40) at that moment. For example, if we could explore with the child at the time that why this task seems like fun is because they know it and can do it, this indicates the lower level of their ZPD. If the child's understanding of the task is contrary to the purposes of the teacher, such as getting it finished, when she intended them to be doing research, this is the point of diagnosis. Evidence cited earlier shows that when these children were asked to specifically look out for a new piece of interesting information when they were watching the video, that became a new fact they learned. Not only that, but it was fun. In those examples being asked to find an interesting fact predicted fun.

Fun has also denoted that a task was within the capabilities of the subjects. Brophy (1999) has suggested that "terms such as meaningful, satisfying, or worthwhile are preferable to terms such as 'fun' for describing the process of intrinsically motivated learning" (p. 8). This chapter has demonstrated that when the target children have used this term, they have been defining it in terms of intrinsic motivation. Where tasks have *not* been predicted as fun there has been no motivation to select them. However, what would still be of concern to Brophy (1999) and should be of concern to us as educators, is that none of the target children sought to challenge themselves by really exploring unknown territory.

Task selection was the initial decision made by the target children. Having selected a task, the subsequent decision/s relate to continuing to engage in the task until completion. The next chapter will spend a little bit more time with two of the target children through one session on Day 7, to investigate the question: Did task selection predict target children's ongoing task engagement and completion? What evidence of the role of emotion during task engagement might be found?

CHAPTER NINE: RULES OF ENGAGEMENT

Dion (11.28am Day 7): What one are you doing?
Rhys: It's easy, it's so easy. Synthesis Four
Kane: This is easier....

The previous chapter reported my analysis of the decision-making processes of the four target children from Study 17, when they were required to choose a set number of tasks from a range of options. It was found that – irrespective of their achievement level and gender, the four target children (the children) used similar categories for selection and elimination. For example, fun was found to be common to all four children as the broad category for tasks that were chosen, and the correlate of interested and other positive emotions. Through my detailed analysis of the children's explanations and other data, fun predicted tasks that were liked, mainly looked easy, and would not take too long. Across the four children, the main emotion correlates in common of these criteria - including fun, were found to be interesting and happy. The main differences lay in which specific tasks met these criteria, with each child having different opinions as to which tasks might be easiest to do. For example, in the brief conversation above Rhys and Kane are expressing their differing opinions to Dion, as to which tasks looked easy. A further important difference was found in the quality and quantity of work actually achieved on the specific tasks. Comprehension 3 was the only task that was selected by all four children.

The purpose of this chapter is to investigate whether task selection on the basis of anticipated fun, easiness or enjoyment has resulted in the target children's ongoing task engagement during a single session. First, I shall briefly overview the four children's task engagement through the 72-minute session on Day 7. Next we shall follow the individual experiences of Dion and Lois as they proceeded through their chosen tasks for the session. I shall pay particular attention to their written task engagement and the factors impacting this. Day 7 was selected as it appeared to typify the children's experience and it also captured each of the children proceeding through at least one task in an individual capacity. Dion and Lois have been chosen for the detailed analysis, as they were the two children furthest apart in their profiles (Chapter Six). Recall that Lois was located in the highest percentile for the Factor 2 emotions of interested, curious and excited (Chapter Six) while Dion was in the highest percentile for the Factor 1 negative emotions cluster, based on his repeated reports of stressed. These two children were also contrasted in terms of their PAT Maths and Comprehension achievement.

I shall present the data on these two children's engagement in their tasks for this session identifying any environmental variables related to their ongoing task engagement. I shall also try to determine whether emotion was an antecedent (independent variable) or consequence (dependent variable), in relation to any significant events that occurred. For example, having chosen their tasks on the basis of fun or predicted positive emotions, at the commencement of this session we might expect Dion and Lois to be feeling positive emotions as antecedent to task engagement. Having identified and analysed crucial adaptational encounters that occurred during this session, this chapter will conclude by arguing that choosing their tasks was only the first of a series of adaptational encounters with the task. At crucial points along the way the children have had to respond to their changing environments. The ways they have both done so gives us further information as to the role of their emotions in their learning task engagement. This chapter will conclude by answering the question as to whether task selection on the basis of anticipated fun or enjoyment, has predicted ongoing task engagement.

During this session the children were working individually on their chosen tasks. Having set up the instruction evaluation system (Nuthall, 2000) on Day 2, the teacher spent minimal time delivering instructions to the class on Day 7. All four children were attentive to the teacher as she gave a broad directive to the whole class to use this hour and a quarter well, to ensure they were all up to date on their tasks. She finished by saying, "Let's get on to it - heavy work – go". This session started at 11.19am and finished at 12.31pm (72 minutes).

The Children's First Responses

Lois was standing directly in front of the teacher's desk, and caught her attention within 15 seconds, "Mrs X, I need the encyclopaedia". The teacher replied, "Oh I put that up the front of the room". Lois thanked her, immediately found the book "Outer Space" and took it back to her desk. Lois was ready to start working with this resource within 30 seconds of the teacher's instructions.

Dion, Abby and Joseph had been sitting at their own desks. They immediately opened their desks, taking approximately 1 minute to check their topic books and organise their writing resources. Abby then went to the book table and obtained the "Spaceways" poem book, taking it back to her desk and was ready to start within 1 minute 30 seconds of the instructions. Joseph joked with Nora, "heavy work. I don't want to do any work that's heavy!" Dion was singing to himself.

Within 1 minute, both Joseph and Dion proceeded to the notice board. Figure 9.1 provides a snapshot of the four children's behaviours at 1 minute 45 seconds after the teacher's instruction.

Teacher: (reads book Katrina's holding) okay just, just pop the –just leave a space so you can come back for that answer. Go on to the next one. Don't spend too long on something you can't find. Mike: Do we have to do these in order or can we just do it? Teacher: No			
Lois Reads book, glances at Adele and Jonelle on computer Writes under "Astronomer" column on "Knowledge 2" page of her topic book.	Abby Brock picks up "Spaceways" book. Abby: What? B: We need this A I do B Oh stink, can we read it? Yeah you're supposed to read A lets go of Spaceways Book	Dion Listens to Rhys: so you can Dion: Copy that R: yeah just copy that um D: What one are you doing?	Joseph Listens to Timothy: Which one do you want to do? Joseph: Oh yeah that's all right. There no it's too cold for that one. Um do you want to do that one? Timothy: Postcards. Is that like the one that we do? J: yep, yep T: Okay

FIGURE 9.1: Transcript Data from 11.20.45am Time 8 Day 7 - Video and Audio Record

Figure 9.1 provides a full transcript of the video and audio data for the 15-second interval of Time 8. This data demonstrates the events occurring simultaneously at 1 minute 45 seconds into the session. The teacher was discouraging Katrina from spending too long on something she could not find. Lois was already underway, copying from the "Outer Space" book into her topic book. Abby was being bullied out of her Spaceways book within 15 seconds of sitting down with it. Dion was consulting with Rhys about the Sea of Tranquillity task requirements, while Joseph was consulting with Timothy as to which task they would work on together.

These first responses typified the experiences of each of the four children. Lois appeared to have been anticipating a prompt start and knew exactly what book she needed, as well as being confident in expressing this need to the teacher. Also because of her preference for fact-finding tasks, she needed the book. Abby was also prompt in obtaining the book she needed which she did without assistance, but she checked her topic book and prepared her desk first. Despite this brief delay, Abby was ready to start work within 1 minute 30 seconds of the teacher's instruction. It was at this point that Brock came along (Figure 9.1) and grabbed the book off her.

Both Joseph and Dion moved up to the notice board once they had checked their topic books. They were both in the position of having to choose their next task. Dion was already consulting Rhys about the Sea of Tranquillity task. Joseph was giving Timothy the opportunity to decide which task they would do together, which is consistent with his preference for working with peers to "spicen" up his work. The teacher was also consistent in her expectations that the children should not waste time, given the number of tasks they each had to do. This might have added to any sense of urgency and the need to finish tasks. Her recommendation to not spend time looking for something "you can't find" (Figure 9.1) was already a strong indicator that perhaps finishing and not researching was the purpose of the activities. Therefore in order to follow the teacher's instructions, the children needed to work with resources they could find quickly. How to reconcile not finding a resource was not addressed. For example, if Katrina could not find the book, why was that? What would she do if this happened every time she tried to find a book?

For this session the children's written task engagement is the main outcome behaviour of interest, because the final evidence of their task engagement was their written answers in their topic books or on sheets of paper (Appendices 5, 7, 10, 11). We can see that all four children were apparently ready to get started on their tasks. But already within two minutes of the session starting we can see that Abby was at a major disadvantage compared to Lois. Her book had gone. To compare the progress of all four children, let's first look at how much time they each spent engaged in their written work. The 15-second intervals coded for writing were tallied for each target child, and the results are reported in Table 9.1.

Table 9.1

Written Task Engagement Time Prior to and Post ESM Data Collection, Day 7 Session 1

Target Child	Written Engagement Pre Mood Probe[a]	Duration Range	ESM Data	Written Engagement Post Mood Probe**	Duration Range	Total Written Engagement
Dion	2min 45s	15s - 30s	Stressed	12min 30s	15s – 1min 15s	15min 15s
Abby	8min 30s	30s – 3mins 45s	Happy Interested Excited Curious	18min	15s – 3min 30s	26min 30s
Lois	21min 15s	15s – 6min	Happy Interested Curious Excited Brain working	34min	1min – 11min	55min 15s
Joseph	13min 45s	1min – 3min 45s	Interested Relaxed	38min 15s	30s – 8min	52min

[a]25 minutes duration **45 minutes duration

Table 9.1 summarises the amount of time spent by the four children in written task engagement, prior to and subsequent to the ESM data collection during the morning session on Day 7. The ESM data collection has divided the session into pre- and post-ESM time frames for descriptive purposes. ESM data collection occurred between 11.42 and 11.45 am. As the session commenced at 11.19am, there were 25 minutes available for written task engagement prior to the ESM data collection and 45 minutes available subsequent to this, before the session finished at 12.31pm. Pre-ESM activities might indicate antecedent or independent variables for the ESM data, while post-ESM activities might indicate post-ESM or dependent variables relating to the ESM data.

Total time spent engaged in writing for the full 72-minute session ranged from 15 minutes and 15 seconds (Dion, Table 9.1) to 55 minutes and 15 seconds (Lois, Table 9.1). Joseph spent almost as much time as Lois (52 minutes), while Abby spent almost half an hour compared to Dion's quarter hour. We can see that prior to the ESM data collection Lois was the most productive, spending over 21 minutes – 85% of the 25 minutes available - in written activities, while Dion spent a total of only 2 minutes 45 seconds writing. Lois's rate reduced slightly in the second half of the session, while each of the other three children's rates increased. Consistent with data presented in the previous chapters, we can also see that Dion's maximum sustained writing at any given time was only 1 minute 15 seconds, compared to Lois and Joseph whose maximum single

writing events were 11 minutes and 8 minutes respectively. Abby's maximum duration of writing was 3 minutes 45 seconds, which was much less than Lois's and Joseph's maximums, but still more than Dion's. These differences might reflect differences in their engagement in other activities such as reading or talking, or that they experienced different sorts of interruptions. There were also differences in the quantity and quality of written work achieved by the four children (Appendices 5, 7, 9, 10).

Following his low rate of writing Dion reported feeling stressed, while the other three children reported positive emotions (Table 9.1). First we shall examine Dion's morning a little more closely, followed by a similar analysis of Lois's morning to see how such differences occurred

Dion's morning

Dion was engaged in two tasks during this 72-minute session. He commenced with the Sea of Tranquillity task until 11.45am, after which time he continued with his space story. Dion's total time spent in written task engagement for each of these tasks is reported in Table 9.2.

Table 9.2

Summary of Dion's Written Task Engagement for the Morning Session Day 7

Time Frame	Task	Range of Duration	Total Time Engaged	% Time Frame	% Session[a]
11.20am – 11.45am	Sea of Tranquillity	15 – 30s	2min 45s	11%	3%
11.46.30am – 12.30pm	Space Story	15s – 1min 15s	12min 30s	29%	18%
Total			15min 15s		22%

[a]70.5 minutes duration.

Dion's total written task engagement comprised 15 minutes 15 seconds, 22% of the 70.5-minute session (allowing 90 seconds taken for ESM data collection from Dion). Prior to ESM, Dion spent only 2 minutes 45 seconds writing about the Sea of Tranquillity, compared to a total of 12 minutes 30 seconds writing his space story (Table 9.2). When he was writing his space story, the longest time spent writing was 1 minute 15 seconds compared to 30 seconds for the Sea of Tranquillity task. Let us now take a brief tour through Dion's activities prior to ESM data collection.

The Sea of Tranquillity Task (11.20 – 11.45am)

As we saw in Figure 9.1, Dion had moved to the notice board within 1 minute of the teacher's instructions. As he read through the knowledge tasks he said to Kane "I done that" about Knowledge 1, before reading the Knowledge 2 task to locate the Sea of Tranquillity. As we have seen previously, Dion clarified this task with Rhys, which only took less than half a minute. Just as they finished talking, the teacher was standing close by and began to assist Bernice and Janey with the same task. Because there appeared to be only one relevant book on the book table, the teacher suggested that the two girls take two photocopies of the appropriate pages. It is not clear from the data whether Dion was actually listening to their conversation (which was audible through his microphone), in which the teacher organised the photocopying. But Dion did not let the teacher know that he was also doing the same task, or that he might also need a photocopy of the material.

Three minutes later, Dion commenced writing the heading "Knowledge 1" in his book while remaining at the notice board. In the absence of a flat writing surface, Dion had to hold his topic book vertically against the notice board in order to write. He stopped after 15 seconds because he was in another child's way. Dion then resumed writing and drawing for 30 seconds, pausing to respond to a comment from Brendan about the shape of his drawing of the moon. He then wrote again for 15 seconds before he stopped again, studied the Knowledge tasks and then looked up to a poster of "The Moon" on the notice board. Dion had spent a total of 1 minute in written task engagement up to this time (11.25.45am).

Having spent 45 seconds reading "The Moon" poster Dion went back to the book table and said to Brendan, "I need the.." suggesting that he had a specific book in mind (suggesting also that perhaps he had been listening to the teacher's conversation earlier). Brendan was looking for a poem book, which prompted Dion to go and look for this as well. He wandered around the room asking others what they were doing and looking at their work. This distraction lasted for 3 minutes 45 seconds by which time Dion was back at the notice board, telling Brendan about a friendly fight he had had with Timothy the day before. This phase of distraction concluded with Dion asking Rhys whether he had finished everything yet. Rhys said "not yet".

Having compared notes with Rhys, Dion then spent a further 30 seconds writing the letters "S E" and drawing a line on his map of the moon, occasionally looking around. He appeared to be

keeping alert for the book that had information on the Sea of Tranquillity, which paid off at 11.29.30am when he saw Selma with it. Dion stopped writing and attempted to negotiate with Selma for the book, first asking, "Hey, can I have that after you?" to which Selma did not reply. He then asked again, "Hey can I have that after someone?" Selma began to reply, "Which one? That?" By then Dion was already going back to the notice board, calling out to someone else, "hey excuse me!"

Dion continued to read from the "Solar System" wall display and talk with peers. He wrote in his book on one further occasion for 30 seconds, before interrupting himself to comment that Katrina's work was "Wicked! Did you write that? " Katrina ignored him. Dion resumed writing for a further 45 seconds, continuing to talk to Katrina, then asking her if she knew the difference between an astronomer and an astronaut. Dion had completed that task previously on Day 3, and it was not clear from the data why he asked Katrina that question. He then briefly moved away from the notice board to find out whether Selma had finished with the book yet. Selma said, "No it takes ages".

Once back at the notice board, Robert asked Dion what was the difference between an astronaut and an astronomer. Dion and Robert then discussed the difference.

> Robert: Yeah that's pretty easy. But this is easier. Sketch and label important parts of a space suit.
> Dion: (reading Application 2): This is easier. Make a model of a creature from outer space out of plasticine.
>
> A few seconds later, they began to compare notes about what they had done:
>
> Dion(11.38am): How much have you done? I've done one, two, three, four..
> Robert: I've done three. You've done four.
> Dion: Oh No. I've done three.
> Robert: Damn.
> Dion: laughs.

They then started discussing the planets, looking at the poster, with Dion saying, "no that's Saturn", then calling out to Chan:

> Dion: Hey Chan, he said that was Saturn
> Robert: Isn't it?
> Dion: That's Saturn

They continued to discuss which planet was which, until a few minutes later when the teacher came by. The teacher asked Dion and Robert together, "How are we going boys? What are you two doing now?" Dion pointed in the general direction of the Comprehension and Knowledge tasks. It was not clear to the observer whether he specifically pointed to the Sea of Tranquillity task, "I'm doing that thing with that." The teacher said "Right", and then turned to discuss Robert's task. Dion did not mention that he was waiting for the book.

Eventually at 11.44.15am, Dion asked himself, "What can I do while I'm waiting? Synthesis 3. Oh man I don't want to do that". He took one last look at Selma's desk and moved back to his own desk at 11.45am. This signalled the end of Dion's attempt to engage in the Sea of Tranquillity task.

Factors Impacting Sea of Tranquillity Task Engagement

When Dion first consulted with Rhys, the task appeared to be simply to "just copy" the diagram of the moon. Dion then chose the task because "I like drawing" (Chapter Eight). It appears that the mode of task engagement appealed to him. Within two minutes of starting this task, Dion realised that the task involved more than simply copying the diagram on the board, and that he needed "the...." (presumably) book for more information. This need for content preceded his first distraction phase of 3 minutes 45 seconds. Without the book, Dion's four occasions of written task engagement amounted to a total of 2 minutes 45 seconds resulting in a heading and an untidy circle in which there were some curved lines (Appendix 6, p. 461). These lines were very similar in shape to the outline of a dark area shown on the original picture of the moon included in the task card. He had written the title "Knowledge 1" (which was incorrect) and "SEA..." to one side of the diagram in the same position as the label on the task card. Dion had therefore used the task card as his sole resource. He appeared to be aware of the limitations of this situation.

Overall it appears that the need for information or task content has predicted the end of each phase of Dion's written task engagement. On each of the four occasions that he stopped writing, Dion attempted to locate information either from the notice board or finding the book. In order to find the information Dion had to read the notice board, or ask others what task they were doing as they might have had the resource he needed. The ceasing of writing has predicted an initial query

about the resource, which in turn has predicted distraction. Were Dion to have located the resource, he might have continued with written task engagement.

The central information centre was the notice board and book table (Chapter Six). However, there were not enough book resources for this task and the information on the displays was not accessible enough. Dion's maximum duration of written engagement at any given time in this context was 30 seconds (Table 9.2). Having to look out for the book while also not being in the optimum position for writing also preceded Dion ceasing writing. Ceasing writing predisposed Dion to distraction. The risk of distraction was further increased due to the central function of this notice board. The numbers of other children in the vicinity at any given moment also afforded ongoing social distraction opportunities.

Dion appeared to persevere through three attempts at finding the book, until he heard from Selma that "it takes ages", after which it took a further eight minutes before he decided to go back to his desk. Dion's interactions with Selma did not demonstrate any problem solving skills, which might have facilitated them sharing the resource or asking the teacher if they could photocopy the relevant pages, as had been done earlier in the session for Bernice and Janey. When Dion finally realised that he was not going to get the book for "ages", a further eight minutes elapsed with no written task engagement before he decided to do something else "while I'm waiting".

Dion had one single 15-second interaction with the teacher. Her question "What are you doing now?" was asked in the presence of Robert. This interaction did not facilitate task engagement. Dion did not ask for help, nor did the teacher discern that he might need it. Having heard the nature of his discussions at the notice board at the time, it would be unlikely that Dion would have wanted to show that he needed help in front of Robert. We heard him protect his adequacy (Lazarus, 1991) in several different ways. First he demonstrated his knowledge of the difference between an astronaut and an astronomer which Robert regarded as easy. Second they were comparing the number of tasks completed, and third, Dion made a point of telling Chan that Robert had got it wrong about which planet was Saturn.

It was not clear where Dion was pointing to nor that it was the Sea of Tranquillity task, the same task that Bernice (PAT Maths 99 & Comprehension 92) and Janey had needed help for, especially photocopying the relevant pages of the one useful book. This might be due to Dion's vague "that thing with that" along with vague pointing.

Having heard that the Sea of Tranquillity task "takes ages", Dion made no further attempts at either task engagement or negotiating for the book. Hearing that the task "takes ages" had two implications. First, he would have to wait ages for the book. Second, anticipated duration of the task itself might also have been the final factor prompting him to stop persevering with the Sea of Tranquillity task. Anticipated duration of a task is an important factor for Dion. As we have seen already, tasks that take too long are unlikely to get finished, and fall into the category of "too hard". Work that is too hard predicts anger and stress and is therefore avoided by choosing an alternative (Chapter Seven).

ESM Data at 11.45am

When Dion sat down at his desk at 11.45am, I asked him to fill out a mood slip. Dion joked to me about Edmond (seated opposite) saying, "he's gonna circle all of them I bet you". He read aloud through the options, "I feel happy, sad, angry, bored, stressed." Dion appeared to be testing each word for suitability, and stressed seemed to match. He confirmed this by telling me his reason for being stressed. "I am stressed for work. I am stressed I don't know what to write (laughs)". Dion was rubbing his forehead at this point. This last comment was directed at Edmond who was saying that he felt bored.

Video-Cued Interview Data

During video-cued interview while Dion was watching this specific event of completing the mood slip on Day 7, he confirmed his experience of stress, which he attempted to define, "like sometimes I can't explain it. And you get real stressed yeah and then you go and then your brain gets like all tight". As I explored this event with Dion he said, "I'm still stressed while I'm thinking about it". Viewing himself in this event of filling out the mood slip, hearing himself say he was "stressed for work, I don't know what to write" and talking about it in the interview appeared to reinstate the stressed state, similar to mood congruent recall (Mayer, McCormick & Strong, 1995).

Dion's explanations are supported by the observation and transcript data for this session. By 11.45am, Dion had made four attempts at writing, and three unsuccessful attempts to obtain the book. Dion's difficulties with both the physical context and the task content had prevented his proceeding with the task. Data presented and discussed in the previous sections provides evidence

also consistent with a further explanation of stress from Dion, "Well like I can't do it like stressed like I'm trying to do it and I can't do it and yeah". Dion had been trying (using his own best strategies) to engage in the task over the previous 25 minutes without success. The social interaction system had also not helped.

Dion engaged in social distractions in conjunction with perusing the tasks again for eight minutes. This might have been intended as calming down time and social relief (Chapter Seven) while he looked for "somethink (sic.) else" to do. From the limited excerpts presented we can see that although some of the discussion were performance oriented (Ames, 1992), there were some content or mastery (Ames, 1992) discussions. These examples confirm the positive role of social interactions for Dion's stress reduction and resulting learning. For example, during this time he was discussing with Robert about which planet was Saturn, this being a further interaction with the new information he had learned since the pre-test. Recall that in his pre-test, Dion had answered this item incorrectly, and then answered it correctly in his post-test (Chapter Seven). Recall also that when Dion saw this information on the video he made a conscious effort to learn the order of planets. However, this did not occur until the afternoon of the day we are discussing now (Day 7).

In summary, task selection on the basis of "I like drawing" has not predicted completion of the Sea of Tranquillity task. During each interruption or adaptational encounter (Lazarus, 1991), Dion has used the same process he used for task selection. He was finding it too hard and stressful to do the knowledge task, so he chose an alternative. This was a reasonable response as the teacher did not want the children to waste time looking for "something you can't find". It was therefore reasonable for Dion to leave the task to come back to. Dion did not make any arrangement with Selma about the book once she had finished, and he did not get back to the task at any other time during the unit. Dion did not have effective strategies to deal with the obstacles he had encountered, even though he had made repeated attempts at continuing. Having reached a point of difficulty due to not having information and not being able to access the book, social distraction has been readily available to alleviate his stressed state.

Post ESM - Space Story (11.50am – 12.30pm)

As the morning progressed it appeared to take some time for Dion's stress to reduce. For example his first phase of social distraction after ESM data collection took three minutes 45

seconds, before he resumed writing. Dion's task engagement for this latter half of the morning session followed a similar pattern to the former. Writing behaviours alternated with distraction. In the context of sitting at his desk, Dion's distracted behaviours included gazing around, rubbing his head, scratching his head, fiddling with his hair or talking with others. Dion frequently frowned prior to ceasing writing, as well as when he was gazing around. Once his attention was diverted from the story-writing task Dion was further distracted by events around him. The computer and other children were also distracting.

During this time frame there were two occasions where Dion made specific attempts to engage others in humour. He tried to engage Rhys in a joke, but was unsuccessful. In the absence of a response from Rhys, Dion returned to his desk and wrote for 1 minute 45 seconds, interspersed with gazing around. After putting his head in his hand again, and writing for 30 seconds he said to Timothy "That was funny yesterday..." This initiated a distraction phase of 8 minutes with laughter and physical horseplay, culminating with Timothy thumping Dion.

Shortly after this at 12.14.30pm the teacher came over to check their progress.

Teacher: How are we going?
Dion: Good.
T: Good? Are you doing your story still?
D: Yeah
T: Okay don't spend too long on it cause you want to move onto the other ones won't you?
D: I'm almost finished
T: Good boy

Following this interaction with the teacher Dion wrote for a total of 5.75 minutes, including sustained engagement times ranging from 15 seconds to 1 minute 15 seconds. Dion's written task engagement rate increased in frequency subsequent to this interaction with the teacher.

Factors Impacting Space Story Task Engagement

When Dion decided that he needed to select another task to do "while I am waiting" he chose to resume his story, rather than Synthesis 3. Dion had originally discussed the story task with Rhys on Day 3 and chose it on the basis of its content, which was "cool" because it could be any aspect of space. The content was therefore to come from Dion's own ideas and creativity. By this stage on Day 7 Dion was taking up the task again with approximately two thirds of a page already completed. Dion was engaged in writing his story on 16 brief occasions throughout this 45-

minute time frame. Over these occasions, Dion demonstrated a range of behaviours preceding those events of ceasing to write and beginning to gaze around or engage other children. These included reading over what he had just written, frowning, rubbing his forehead, looking over at the computer, engaging in dialogue with other children, putting his head in his hands, or hitting his jaw. Having gotten to know Dion, we can predict that these behaviours meant he was having trouble with ideas. As with the Sea of Tranquillity task it appears that the immediate need for content in the form of ideas, has predicted the end of each phase of written task engagement.

Task Mode

As for the Sea of Tranquillity task, a written mode of response was required. We have already seen that Dion writes at a slower rate than the other three target children. For example he took 7 minutes 30 seconds to complete a total of 4 lines for the Comprehension 3 task (Chapter Seven), which he enjoyed doing and for which for which he had "heaps" of ideas.

Physical Context

Dion was sitting at his own desk for the latter 45 minutes. Timothy was at his desk between Dion and Lois from 12 noon onwards, while Lois had been at her desk for most of the session. During this session as was the routine, other children were working in pairs at the computer immediately behind Lois and close to Dion. The computer afforded distraction in several ways.

- From Dion's desk, the noise of the computer and presence of peers functioned to either create the distraction or afford distraction when he had run out of ideas. For example, within one minute of commencing story task engagement, Dion frowned and looked over at the computer, asking for the volume to be turned down. This happened on more than one occasion, thereby increasing Dion's susceptibility to further distraction.

- Once his attention was diverted from writing Dion frequently became involved in discussions about the computer roster as a topic of conversation. He appeared to know whose turn was coming up and how much time they should be having. For example, in the last 15 minutes of the session Dion offered to keep an eye on the time and was watching the clock on behalf of Chan and Kane who were due to have their turn after Edmond and Brock. It was Dion who then asked these latter two to get off the computer when Chan's and Kane's turn came round.

- On other occasions when he was already distracted, the computer was something else to gaze at.

Social Interaction System

The physical proximity of other children also afforded social distraction opportunities. These occurred in several ways.

- Occasionally Dion was distracted when he overheard Lois talking with other children, and he would attempt to join in. For example, he was ignored when he asked a question about helium, and then attempted to demonstrate that he did actually know that there was helium in space.

- On other occasions, when Dion's attention began to drift from his writing he would gaze around, and then attempt to engage others as a result of what he was observing around the room. For example, he was already distracted when he overheard Lois talking to herself, which then prompted him to talk to himself about her topic.

- The third type of social distraction was intentionally off-task. For example, Dion specifically initiated humour as a distraction on two occasions, each of which had been preceded by gazing around behaviours. Having gazed around and put his head on his hands, he made a point of going over to Rhys to make the joke about clowns in World War 2. Neither Rhys nor Mike responded to this so he went straight back to his desk.

Instruction Evaluation System

During Dion's second interaction with the teacher he was told not to spend too long on his story. When he reported that he was "nearly finished", she said "good boy". While she did not offer any more specific guidance than the previous occasion, Dion's rate of written task engagement increased after this interaction with the teacher.

Summary of Factors

In summary, it appears that the need for ideas has predicted the end of each phase of written task engagement over this second task of the session. Having ceased writing on 16 occasions, Dion was unable to quickly come up with further ideas for his story. The need for ideas was demonstrated in his body language including his frowning, rubbing his forehead, thumping his forehead, and thumping the table.

Dion's maximum written task engagement in this context was 1 minute 15 seconds. Ceasing writing predisposed Dion to distraction. Distraction was afforded through the physical context either directly - due to the noise of the computer, or indirectly - through social interactions afforded by the proximity of other students.

Emotion Correlates

Prior to ESM data collection, Dion's stress level developed as a consequence (dependent variable) of a series of negative interruptions to his trying to get on with the Sea of Tranquillity task. We heard him singing at the very beginning of the session and he told us that he had chosen to do the Sea of Tranquillity because he likes drawing. It appears that he started this session feeling positive, anticipating a positive task. At the time of circling stressed on his mood slip, Dion's stressed state was in situ.

Immediately prior to ESM data collection, Dion went back to his story as an alternative easy task for the rest of the session. Generally, writing his story correlated with fun and feeling "normal" (interview data cited previously). However, in this situation he was already feeling stressed and within his first minute of writing, he was frowning at the computer. Dion has explained in the previous chapter that the noise of the computer made him feel "sort of angry I got angry about it couldn't do my work". When he circled stressed on his mood slip on this occasion, Dion explained to the observer that he did not "know what to write". This was consistent with his interview evidence of stress occurring when he has to try to think. In the situation of trying to write his story, feeling stressed appears to have become the independent variable for difficulties in his story writing. Therefore from becoming stressed due to not accessing the book earlier, Dion's stressed state then predisposed difficulties with the next task as well.

When Dion ran out of ideas, his behaviours confirm that he was stressed. During video-cued interview he laughed at himself when he watched himself hit his head during an event during the afternoon of the same day (Day 7), and said to me "That's probably when I got stressed..... I don't know whether I was trying to get it out of my head" (Chapter Seven). It appears that Dion experienced stress not only during this morning session but also during the afternoon of the same day, confirming his statement that he gets stressed at school "quite a lot".

Over this latter 45 minutes Dion remained seated at his desk, apart from his unsuccessful attempt to engage Rhys in a joke. Dion then specifically initiated an eight-minute period of joking and horseplay distraction at 12.05pm which suggests that he already was feeling bored by this stage. As he has explained earlier, joking also relieves stress. Once the teacher had spoken with him, Dion engaged at a higher rate. This might have been due to her reinforcement of him being a "good boy" because he was "nearly finished". Alternatively her instruction to "don't spend too long on it" might have alleviated the stress associated with not finishing. It might also have been due to his social interactions having reduced his stress prior to this interaction.. Immediately prior to this interaction with the teacher, Dion had been watching the teacher talking with Edmond. As he saw the teacher move towards him Dion actually commenced writing.

Total Written Task Engagement

Dion attempted two tasks during this morning session. It appears that irrespective of the specific task chosen or differences in his physical location in the classroom for each, Dion's task engagement has been intermittent and impacted by similar factors. For both tasks, the need for content or ideas has predicted Dion's ceasing of task engagement, predisposing him to distractions afforded through the physical context and social interactions.

Summing up Dion's Morning

It appears that irrespective of the task during this session, Dion was having difficulties in achieving sustained task engagement. For the Sea of Tranquillity task, it appeared that Dion wanted to proceed with task engagement. He persevered with trying to obtain the resource. For the story task, Dion's frowning responses to the computer noise suggested that he also wanted to write his story. He attempted to write on a number of occasions, apparently ceasing only when he ran out of ideas or was interrupted. However, on several occasions, in the absence of

interruptions beyond his control, Dion deliberately sought out distraction opportunities. In both tasks, ceasing writing predicted periods of distraction and a feeling of stress due to the difficulty in being able to proceed with the task. Dion's self-report of feeling stressed is consistent with previous evidence in relation to his own theories of stress and how he prefers to avoid hard work.

Dion chose the Sea of Tranquillity task because he likes drawing and the story because it was fun. Dion persevered over the first 25 minutes of the session indicating that he does try. Interview evidence confirms this as he has explained that it is when he has been "trying" without success in obtaining ideas out of his head or information from somewhere else, that he experiences stress. Writing the story in this particular session, was a second alternative due to not being able to obtain information for the former task. He was feeling stressed as he commenced this task. It was only towards the end of the full session that his stress reduced enough for him to write his story. It appears therefore that Dion's reasons for selecting both Day 7 tasks were not enough to sustain written task engagement. Once underway with the tasks Dion's ongoing engagement was impacted by a number of factors similar to his decision-making process (Chapter Seven).

Dion interacted with the teacher on two occasions. These interactions were opportunities for him to let the teacher know that he was having difficulties. On both occasions, he gave the teacher minimal information delivered in such a way as to suggest that he had the tasks well in hand. Eventually he managed to write some story, perhaps because the teacher said that he did not have to spend too long or perhaps because she said "good boy". It is not clear why, but his rate of writing increased after this interaction. One question that I did not think of asking Dion during his interview was why did he not look up the Sea of Tranquillity in his cool facts book? It may not have been in there, and he may have already known this.

Spending this morning with Dion, and being able to identify the problems he was having in actually getting the resource he needed has confirmed that not getting the book or an alternative resource was the first antecedent stressor that occurred within the first few minutes of the session. This basically ruined Dion's morning. He had been cheerfully singing, had checked with Rhys that it was a drawing activity, and because he likes drawing, he decided to do this task. Due to the resource problem not being solved, choosing to do his story did not immediately reduce his stress. In fact, during the interview he felt stressed again just thinking about it. Feeling stressed predisposed the distractions and anger at the computer noise, as well as needing to socialise and joke to reduce his stress.

Overall and in summary, the events of this session have demonstrated that Dion's overt indicator of "stress" was an accurate and reliable indicator of his problems with task engagement.

Lois's Morning

As shown at the beginning of this chapter (Figure 9.1, p. 339), within two minutes of the session starting, Lois was already reading the book entitled "Outer Space" and writing into her topic book. During this session Lois completed the following four tasks:

Knowledge 2: What is the difference between an astronaut and an astronomer?
Analysis 4: Is the sun a planet? Explain. Give Four reasons to show why the sun is important to life on earth.
Evaluation 4: What would be the advantages and disadvantages of living in space?
Comprehension 1: Describe what living in space is like for astronauts today. You could write this as an astronaut's diary.

Table 9.3 demonstrates the sequence in which Lois completed these tasks.

Table 9.3

Sequence of Task Selection and Time Frames of Task Completion by Lois, Day 7

Task	From	To	Time Frame	Output
Knowledge 1	11.20.15	11.27.30	6min 15s	Full column *An Astronomer*
Analysis 4	11.29.45	11.54.15	24min	Full page *Is the sun a planet?* (ESM)
Evaluation 4	11.59.30	12.18.15	18min 45s	Full page *I would like to live on Earth*
Comprehension 1	12.20.00	12.30.45	10min 45s	.75 page *Astronaut's diary*

Having commenced task engagement within 1 minute 15 seconds of the teacher's instructions, Lois spent minimal time between tasks, these intermissions being 2 minutes 30 seconds, 5 minutes 15 seconds, and 1 minute 45 seconds respectively. Total time spent on tasks (including reading) amounted to 60 minutes 15 seconds.

From 11.20.15am Lois spent three minutes copying from the book "Outer Space", followed by a further three minutes writing in her own words about astronomers (Appendix 6, p. 478). Lois kept this book at her desk during this first task, keeping it safely under her own topic book as she wrote. As Lois moved to the notice board during her first "intermission", Brendan paused at Lois's desk. He stood and perused the book briefly before moving on, but left it on her desk. Kitty then asked Lois if she could "quickly borrow" the book. Lois obliged, but was then gazing around apparently not writing anything further until Kitty offered it back within 1.5 minutes. Lois received it saying "Thanks." Kitty then immediately borrowed it again taking it off Lois's desk. Within a further 1.5 minutes at 11.33am, Lois called out, "Kitty Kitty!" Kitty immediately by handed the book back to Lois again.

Lois started reading, "What is a solar system?" from the book. Of interest, this was information she learned in order to correctly answer multiple choice Item 8, "The solar system is the sun and all the planets". This was the one multiple choice item that she had not known in the pre-test, and answered it correctly in the post-test. Kitty had apparently been keeping close watch on Lois because she asked for the book again very promptly after Lois had appeared to be not specifically referring to the book. Lois replied, "You can have it now. But give it back to me cause I really need it later on, but take your time it's ok". However barely 30 seconds later, Lois went over to Kitty and picked up the book again asking, "Kitty can I please borrow the book? I just need to find one information."

Having then retrieved the book from Kitty, Lois maintained possession of it for the duration of the morning session. Kitty did not ask for it again, and neither did Lois offer it. Lois spent from 11.37.15 am until 11.47am copying from the book into her topic book. She was interrupted for 30 seconds during which she filled out the mood slip. Most of what Lois wrote over this time was copied directly from the book, with only minimal sections paraphrased using her own words (Appendix 8, p. 478). At 11.47am she was interrupted by the noise of an argument between Edmond and Jonelle over whether it was Edmond's turn for the computer yet.

Lois called out to the teacher "Mrs. X, Edmond's on the computer", and continued to write from the book until she was interrupted 1 minute later by Kellie asking her a question.

Kellie: Lois why is the sun important to Earth?
Robert: Because it gives us warmth.
Lois: (to Robert) oh shush

Lois (to Kellie) because it provides light and heat

It is possible that Kellie only needed to ask Lois because it was Lois who had the book. Kellie continued to consult with Lois for three minutes about this content. During the consultation, Lois assisted Kellie with information from her own topic book, and ignored Dion's attempt to join the discussion. Kitty came over and was interested to know how much work Lois had done:

Kitty: How much have you done of yours? Whoa Lois yours is up to- Shoot yours would be up to date. Yours is the best. You've done Brilliance.
Lois: Oh well.

They continued to talk together about asteroids, with Lois reading aloud to Kitty, answering her questions with facts from the "Outer Space" book. Lois read out that if an asteroid collects hydrogen and helium, it becomes a shooting star. It was at this point that Dion interjected, in response to which Lois ignored Dion, laughed and continued by answering the question to Kitty. Once Kitty had obtained the information about asteroids from Lois she moved back to her own desk. Lois continued to write "because it provides us with light and heat" while saying the words aloud to herself. Adele then interrupted her before she had finished, to ask her how many tasks she had done. Lois finished writing at 11.54.15am, moving immediately up to the notice board to peruse the tasks.

Lois left the book on her desk.

Social Interactions re Workload

Lois spent a total of 5 minutes 15 seconds between tasks this time. While at the notice board she perused the Knowledge tasks first, talking to herself.

Lois: Number 4, find the meaning of these words and make your own space encyclopaedia. No thank you. (Sighs)

Lois then read through the full range of categories, eventually making her decision and writing in her book, "Evaluation 4" (Appendix 8, p. 480). Lois then stopped by Kellie and Kitty, and asked them how many tasks they had done. Having heard their totals, Lois went back to her desk and counted up "I've done one, two, three, four, five, six, seven, eight" and then waved Kitty over.

Lois: (to Kitty) But come here. But the thing is that like me and Kellie and Bernice, we're in the high group.
Kitty: Yeah yeah
Lois: And we have to do heaps of work.
K: I know. You should – you should only be doing like one of knowledge.
L: Yeah.
K: To give you a break.
Lois: But look, like everybody gets to do one each or two each, and we have to do three knowledge, two comprehension, and three analysis, two application, and three synthesis and three evaluation.
Kitty: It's not fair.
L: Exactly.

Kitty then went on to say that Lois would probably get top marks. Lois laughed suggesting that no, it would be Kitty who did. As Lois began to write her next task, she said to herself,

Lois: How come that I've got more work to do?

Evaluation 4 Task

Lois made her decision as to which planet she would like to live on. She decided on Earth, but took 15 seconds out by going up to the notice board, to check whether she could choose Earth. She said to herself, "It doesn't say. It says including Earth, so I should put Earth." Lois then immediately commenced writing her answer to the task, spending 30 seconds referring to the "Outer Space" book before closing it and continuing to write her answer (Appendix 8, 480). She thumped her desk in apparent impatience shortly after commencing. While continuing to write Lois began to refer to the book as she introduced a second option of living on Mars if Earth dies, saying "hope not" to herself. Lois wrote while continuing to refer to the book for a further 11 minutes, clapping her hands when she had finished, and saying to herself, "There".

She then spent from 12.15.30 to 12.16.45pm illustrating her work, including a brief remark to Robert that he had to stay in at lunch time. Adele mentioned to Lois that Robert had said she should leave the microphone on when she went to the toilet. Lois did not respond to this. At this time the teacher moved past Lois on her way to the cupboard to get some cardboard for Kane.

Teacher Interaction re Workload

As the teacher passed by her, Lois heard her praising Kane for being up to his fourth task. While continuing with her illustrating task, Lois was also watching and listening to the teacher as she

then checked Kellie's progress through the tasks. Kellie reported that she had done four tasks today. Lois then stood up and spoke to the teacher herself.

Lois: Mrs. L I think I've done – I've done fourth yeah, three, four, five, six, seven, eight
T: You'll do another eight
Lois: But it's unfair.
T: No it's not.
Lois: Why?
T: Because people work at different levels don't they? And really if you only did eight, you'd be finished now wouldn't you?
Lois: Yes.
T: Well done Where did you get all this information?
Lois: From books and some from home and stuff like that.
T: Good girl. Well done.

Lois was apparently effectively persuaded out of her dissatisfaction as she then went back to her desk and finished her illustration.

It was now 12.18.30pm and Lois went back up to the notice board, informing the teacher of her intention to do a further task on her way. As she perused the comprehension tasks, she told Kane "oh stop it!" in response to a remark he made. By 12.20pm she had commenced her next task Comprehension 1.

Comprehension 1 Task

Lois continually referred to the "Outer Space" book as she wrote about weightlessness in her astronaut's diary, remaining fully on task throughout the full 10 minutes 45 seconds until the end of the session. She managed to stay on task despite several brief interruptions. As she commenced she told Edmond and Brock (at the computer) to "shsh people" once at 12.21.30pm and then again at 12.22.15pm, "Shush". She then said to herself "geez people these days!" Dion called out to the boys, "are you actually learning anything?" to which Lois responded "Exactly". Having completed this brief response to Dion at the expense of Edmond and Brock, Lois was then consulted by Adele who wanted her opinion about her drawing of the sun. Lois confirmed for Adele that the sun did look like the original that "it's meant to look like".

ESM data 11.45.30am

Lois was engaged in the Analysis 4 task, "Is the sun a planet?" at the time of completing the mood slip. Eight minutes prior to this she had retrieved the "Outer Space" book and had been fully engaged in copying information from it into her topic book. During the one minute preceding her completion of the mood slip, Lois had been copying out "about 5 million years time, the sun will have burnt up all of its hydrogen fuel."

Lois promptly circled "happy, interested, curious, excited", also adding "brain working". She returned the mood slip to the observer, without taking her attention away from her work, continuing to write "it will become a hundred times." Referring to the book again, she appeared to realise she had made a mistake, slapped her desk as she erased and then corrected her work. She was thus engaged for a further one minute until she was interrupted by the argument between Edmond and Jonelle, followed by Kellie's consultation.

Summary of Events as Antecedents to Positive Emotion Self-Report

Prior to receiving the mood slip, Lois had been engaged in her preferred activity, that of finding facts. Her self reported mood states were consistent with the evidence presented in Chapter Eight, from which it has been argued that previous success in this type of activity has resulted in a positive emotional conditioning history for Lois, in relation to the requirements of the tasks.

Prior to the mood probe, Lois had only one event of annoyance, this being when Edmond was looking at the computer. She had been actively engaged in copying new information from her book for much of the preceding 25 minutes.

Summary of Events Subsequent to Experience Sampling Data

During the latter part of the morning session, following the mood probes, Lois was subjected to a number of interruptions. From previous evidence we know that Lois finds it annoying being regarded as the consultant on a regular basis. However, due to Lois having been in possession of the most suitable resource, both Kitty and Kellie needed to consult with her to obtain information from the book. Other interruptions included the noise of an argument and a number of brief reprimands to several of the boys, including Edmond twice, as well as Robert, Kane and Brock.

Social Context

As we saw above, Kitty approached Lois very politely and with caution when she wanted to "quickly borrow" the "Outer Space" book and appeared to be aware of the moment that Lois might need the book back. Later she praised Lois for her "brilliance", before asking her for some information about asteroids. Lois retained hold of the book while she looked through and read out the information to Kitty. Kellie was also prepared to interrupt Lois and ask her for information, which Lois appeared to tolerate and shared some information with her. Lois has reported that she likes working with Kellie because she is prepared to work. However, Lois does not have much patience with the boys.

The amount of information shared with both Kitty and Kellie was in the full control of Lois. As the reputed academic leader of the class, and due to her perceived role as an ally of the teacher, when Lois needed a resource or removal of irritations, her needs appeared to prevail. In her management of Edmond, for example, Lois has demonstrated that she would readily report children who might prevent her from achieving her objective, or who annoy her. She has also been very clear in interview that "I just don't care about anybody, I just care about my work" (Chapter Eight). Further, once she has reported a child (generally boys as demonstrated during this morning, and whom she regards as not being "sensible"), Lois will join with the teacher in correcting him/them. The teacher appears to condone this approach, allowing Lois to act as co-admonisher in parallel with her, which in turn would confirm Lois in this role, for the whole class. An example of this occurred when Lois reported Edmond earlier in the session.

> Lois: (To teacher) Edmond keeps on looking at the computer.
> Teacher: I know, I know. I'm just going to turn you (referring to the children at the computer)around cause Edmond's a bit of a problem child with this computer.

Later Lois told on Edmond again.

Lois engaged in different sorts of social interactions with the other children in the class. Those involving reprimands tended to be initiated by Lois whereas other children initiated consultancy interactions. Lois initiated a dialogue about her own work -load with other children and then with the teacher, following her overhearing of the teacher praising both Kane and Kellie for the number of tasks achieved this session. Lois gained support from Kitty about the unfairness of her workload. Eighteen minutes later, having completed her third task of the session, Lois raised this

issue with the teacher. While she was prepared to state her view to the teacher, that it was "unfair", Lois did not pursue the issue to the extent that she had with her peers, or to herself. Instead she volunteered to the teacher one minute later that she was about to commence her next task.

Physical Context

In order to engage in her preferred activities, Lois required the "Outer Space" book resource. She ensured that she obtained possession of this within one minute of commencement of the session through her brief consultation with the teacher. She then maintained possession of it through her successful management of Kitty and Kellie. In contrast to Abby's experience (Figure 9.1) Lois was able to leave the book on her desk in her absence. Brendan looked at it but did not take it away, and Kitty was very careful to obtain Lois's permission to "quickly borrow" it. This "Outer Space" book was actually a class resource and theoretically available to any child who might need it. Lois had obviously used the book previously, as she knew exactly which book she needed at the start of the session, as did the teacher.

On the first occasion that Lois did not have the "Outer Space" book, she was only able to complete 1.5 lines of written text. On the second occasion she was without it for only two minutes, before she needed to look up about helium and hydrogen. Without the book, she made an error, which required erasing and she gazed around several times. These behaviours were similar to those of Abby and Dion when they were also not sure of what to write next. A comparison between the "Outer Space" book material and what Lois wrote during this session, demonstrates a high rate of similarity of content, with minimal text written in Lois's own words (Appendix 8, p. 478).

Lois has also demonstrated that she can manage her physical environment. For example, she was able to get the teacher to attend promptly to the computer problem, particularly as it caused annoyance from Edmond.

Interactions with the Teacher

Lois interacted with the teacher on four occasions, for a total duration of two minutes. Two of these occasions were reprimanding Edmond. Her longest conversation with the teacher was her

discussion about workload, which took one minute. Due to Lois's preference for reading and finding information in conjunction with her high expectations of her own performance (Chapter Six), she had engaged consistently throughout the preceding six days, producing more in terms of quantity and quality than the rest of the class. By Day 7 she had counted up and realised that she still had the same amount of work ahead of her. In comparison to what was expected of the majority of the class, her perception was that it was unfair. Being told by the teacher that she was a "good girl" stopped her complaining and was the antecedent to Lois getting back to work, also making sure she told the teacher that she was doing so. This was a similar process that the teacher had used with Dion, and his written engagement increased following being told he was a "good boy".

By the next morning (Day 8), Lois was tired, which she attributed to having watched a medical programme on TV on Day 7 evening. On Day 8 Lois spent only five minutes engaged in topic related activity, and wandered round the room discussing her own interest area of human anatomy (Chapter Six). Such was her preference for talking about the shape of the human jaw angles, that she even initiated dialogue with the boys, who had previously been an annoying stimulus. In this instance the readiness of some of the boys to be distracted afforded Lois the opportunity to engage in her favourite topic. She chose to do this rather than continue with more of her allocated tasks.

Emotion Correlates

We have analysed Lois's task engagement during the morning session on Day 7. The data have demonstrated that Lois sustained written task engagement for over 55 minutes. It appears that for Lois, selection of a task or tasks on the basis of anticipated enjoyment has predicted ongoing task engagement. However Lois would not have been able to continue with task engagement had she not maintained possession of the "Outer Space" book. When Lois attempted task engagement without the book she demonstrated gazing around and erasing behaviours, similar to responses made by Abby and Dion in similar situations.

Lois's anticipated enjoyment was on the basis that her chosen tasks predicted reading books and finding new facts. Lois has been reinforced for fact-finding behaviour and based on the positive emotional conditioning associated with this history, she is likely to engage in these sorts of activities. Lois was specific in her statement that "I like reading books and finding facts" (Chapter

Eight). Enjoyment or liking of reading books is a reinforcing consequence for obtaining books, which is reinforced by finding facts, this in turn being reinforced by teacher praise and meeting the research task requirements. Obtaining the book/s is a crucial first step towards this chain of events, and speeds the process along. This is particularly important when the performance goal (Ames, 1992) is high, and perhaps might be justified due to her "unfair" workload.

Lois has consistently reported that she loves school, and was interested in space topic, underpinned by her mastery goal (Ames, 1992) of being on the lookout for learning new facts. It appears that not only does Lois have positive emotions successfully paired with these classroom-appropriate behaviours, but that reading books and finding facts have also been successfully conditioned together. Lois appeared to need the book with her at all times. Even though she has demonstrated that she is successful in reading for 1 – 2 minutes and then reproducing the piece of information just read from short-term memory, Lois appears to require the book to be on hand at all times. Her workload expectations may have created this need due to her not having the time to be repeatedly searching for or borrowing the book back. As has been demonstrated in this chapter, Dion was disadvantaged precisely because they could not find the resources he needed.

Lois's high academic and senior status in the classroom had predisposed the whole class to understand that she had preference with regards to resources. This means that, in contrast to Abby's experience, any resource she has selected was safe and could be confidently left on her desk in her absence. This ensures an ongoing source of information available to Lois, which she can then read, find her new facts and transfer these facts to her topic book. Lois has been overt in her readiness to report the misdemeanours of others to the teacher, as well as join with the teacher in the reprimanding process. The teacher allowed Lois to act in this way, and also occasionally engaged her to sit at the teacher's desk and mark class work. This has resulted in a "teacher's pet" perception (Chapter Six), which might explain why Brendan was not disposed to taking the book off her unattended desk.

Kitty and Kellie, in previous interviews have indicated that they like working with Lois as she has a lot of skills, and they have both worked with her on previous occasions. Their personal history with Lois would facilitate their willingness to consult with her, and to negotiate rather than confront her, in order to keep their working relationships viable. Therefore, in her management of her peers and the teacher, Lois has either consciously or unconsciously created a classroom environment for herself, which fully supports her own performance, mastery and long term goals.

This section has demonstrated that Lois's selection of the four tasks during this session based on her expectations of enjoyment has predicted her ongoing task engagement. Against her positive emotional conditioning history and the range of features relating to her status in the class, Lois was also subject to a sense of injustice, which might have impacted her task engagement the following day (Day 8). Despite her unsuccessful attempt to re-negotiate her workload any sense of injustice she was experiencing on Day 7 did not prevent her from commencing and completing her fourth task of the morning. She did demonstrate annoyance as she commenced, but quickly responded in her pattern of reading the text and writing in her book, completing 0.75 of a page in 10 minutes 45 seconds. However, by the next day, Lois spent the majority of the session engaging in off-task talk with several of the boys (Chapter Six). This might have been due to tiredness, or a reaction against the unfairness of her own workload, especially in relation to her long term goal, and preferred interest in human anatomy.

The emotion literature provides evidence that being in a positive mood fosters creative thinking (Isen, Daubman & Nowicki, 1987), and that people in good moods are more likely to generate a larger number of future plans for themselves and be better placed to take advantage of future opportunities (Salovey & Mayer, 1990). The data presented in this section on Lois's Morning has demonstrated that Lois was consistently in a positive mood state (apart from some minor irritations) and that she was successful in taking advantage of the single and apparently most useful resource. The irritations and annoyances experienced by Lois reflect her emotion system responses to events, which might have obstructed her goals at the time, consistent with Lazarus's (1991) core relational theme for anger. But they have not been prolonged enough to reduce her positive emotional state.

Dion and Lois – Their Task Engagement and Emotion Correlates Compared

The evidence presented in the preceding sections has demonstrated the unique and contrasting experiences of Dion and Lois as they engaged in a series of tasks during Session 1 on Day 7. During this session these two children worked individually on their assigned tasks. Recall that Lois and Dion normally sat at the same group of desks, with their own desks separated by Timothy's (Chapter Six). During this session, Lois had been at her desk for the full duration, Dion came back to his desk at 11.45am, and Timothy returned to his desk around noon. The computer was situated immediately behind Lois and diagonally behind Dion.

There were similarities and differences in the experiences of Dion and Lois during this session. We have seen the various adaptational encounters (Lazarus, 1991) that they have experienced as they proceeded through their morning. The business at hand for each of them was to achieve their individual goals of finishing their set number of tasks in the least amount of time, while protecting their individual adequacy and their individual identity (Lazarus, 1991). Throughout this chapter we have seen differences in the impact of each of the four systems (Nuthall, 2000), namely the instruction-evaluation system, the physical context, the social context and the students' own personal skills and knowledge systems, on their emotions and task engagement.

Personal Skill and Knowledge

Both children started the session off in a positive state, yet they finished the session with vastly different achievement. Dion had spent a total of 15 minutes 15 seconds actually writing in his book, while Lois wrote for a total of 55 minutes 15 seconds (Table 9.1). In addition, individual differences in the rate of words written per time frame of task engagement was demonstrated in the differences in their total output for this session. Lois completed four tasks having written the equivalent of more than 3 pages of neatly written and illustrated script (Appendix 8, p. 478). In contrast Dion completed a heading and circular outline of the moon for the Sea of Tranquillity task (Appendix 6, p. 461), and one third of a page of story (Appendix 5, p. 459). This is consistent with the data on the Comprehension 3 output where Dion achieved four lines over 7 minutes 30 seconds, and Lois achieved 16 lines of writing in 11 minutes (Chapter Eight).

There appear to be several differences in these two children's personal skills and knowledge systems that have contributed to the wide disparity between their outcomes for this morning. Lois appears to have better skills in knowing what she needs as well as planning how to obtain what she needs. In contrast Dion does not plan ahead, and has no negotiating skills on his own behalf. Lois has actually said that she does not care about anyone else she just cares about her work, indicating that she is very focused. In contrast Dion is much more vague.

The first crucial difference was seen in their differing success in accessing resources. Lois knew what book she needed, and she had the organisational and interactive skills to make sure she obtained it. Further, she maintained possession of this very useful text reference, which resulted in her being equipped to complete four tasks over the full session. In contrast, Dion had been unsuccessful in obtaining possession of the resource required for his first choice of task this

session. As a result, Dion was stressed by mid-session, and it was in this state that he then decided to go back to an earlier task – that of completing his story. However he was having trouble with ideas, which was the outcome of his stressed state.

Another difference is seen in Lois's skill at writing, which she practises every time she writes. For example, Dion can perform writing behaviours, but is slow and does not know what to write. In contrast, due to the ease and speed with which she can access resources, Lois has practised her reading and copying behaviour more frequently than Dion (or Abby) for example, hence is able to write quickly and legibly, making few errors and producing more quantity of text per task.

Lois has also practised to a high level of skill, the art of quickly perusing books for relevant items of information. This reflects her better vocabulary and reading comprehension skills, although on paper their PAT scores were not very far apart. Dion scored 52 compared to Lois at 60 for Reading Comprehension. However, these tests may have been done earlier in the year and the separation may have increased in the interim. With any skill the more practise that occurs, the quicker and more efficient a person becomes. This is demonstrated in Lois's reproduction of facts from different parts of the "Outer Space" book, which she has linked "seamlessly" enough to appear to be an original flowing piece of writing (Appendix 8, p. 478). In addition, due to the amount of practice she has had with finding facts, Lois has also stored many facts in her long-term memory, hence she is able to retrieve and include some information from memory as well. However, she appears to need the security of having the book close by at all times. Having the book close by provides continuing access to new facts, when the need occurs, such as the above event of needing to find out about hydrogen and helium when Kitty had the book. Without the book she exhibited the same behaviours as Dion in looking round and not writing. The difference for Lois was that Kitty was on the alert to give the book back as soon as she detected Lois's need.

Lois was "happy interested excited and curious because her brain (was) working", compared to Dion's likely "tight brain". However in order for this to happen Lois definitely needed the book. As we saw above, when Lois did not have possession of the book, she made an error, gazed round and did not have enough information to engage in the task.

This demonstrates a further important individual difference between Lois and Dion. Lois made sure that she was in the right place at the right time. Within 15 seconds of the commencement of the session, she articulated her resource requirement to the teacher, who gave her its specific

location. Lois was then swift in obtaining it from the table. Also very importantly, Lois was able to retain charge of this classroom resource, allowing Kitty to "borrow" it only as it suited her requirements. In contrast, Dion did not ask the teacher for assistance with resources, and the teacher did not offer any, despite evidence that the Sea of Tranquillity task was problematic in terms of what to do and where to find the information. When Dion did locate the book, he was unable to negotiate with Selma for use of it. She appeared to ignore his requests for being the next person to get the book, and finally told him that "it takes ages". Dion finally gave up on this task.

Dion's language when seeking assistance was not specific. For example in response to the noisy computer, he wanted the sound down "or something" as indicated above. When he did not get a reply from Selma about the book he asked if he could have the book "after someone?" Earlier he had asked himself "what's evaluation?" He apparently was not expecting a reply, and did not follow it up. When he pointed out to the teacher that he was doing the Sea of Tranquillity task, he was vague in saying "that thing with that". It is possible that the teacher did not actually see which task he was pointing to. In contrast, Lois was very specific about her requirements when communicating with both the teacher and peers. Even when she wished to argue her workload she was articulate. Unfortunately she was unsuccessful. This might have correlated with her increased rate of annoyed responses subsequently, and her lack of task engagement the following day.

These two children's opposing status in the classroom appeared to be derived from all of these variables, which the classroom perspective translated as Lois being "real smart", and Dion being "slow" and by inference – not smart. In other words, ability labels have been applied to a range of variables that actually shape the child's ability. It becomes a self-fulfilling prophecy.

Physical and Social Contexts as Antecedent Variables

From the data analysis on Lois and Dion the importance of the physical context and access to resources has been identified. The physical context has been inequitable in its affordance of access to the required resources. In addition Lois appeared to use the classroom layout to her advantage. At the commencement of the session she was well positioned to obtain the book she needed. She had positioned herself in front of the teacher, and was consequently able to obtain her attention immediately. In this location she was also closer to the book table affording her

quicker access to the book before anyone else picked it up first. Having obtained the book, she was able to risk leaving it on her desk unattended, in the knowledge that it would be safe. Anyone wishing to borrow it would need to ask her permission, which Kitty did so. During the events when Kitty and Kellie needed information, it appeared to be at Lois's discretion, neither of the two girls stating the obvious – that this book was for the whole class and should be shared.

The safety of Lois' resources reflected her academic status, and perhaps the class-wide knowledge that obstructing Lois's needs would result in a reprimand, from either Lois or the teacher or both. This was also demonstrated in her repeated instructions to the boys to be quiet, and her complaint to the teacher, which resulted in the computer being moved. When Lois became annoyed she was able to attend to the cause and return to a more positive emotional state to continue with task engagement. Annoyance was due to the interruption to her mastery and performance goals. When it suited her however Lois used Kitty as an almost ally of her own, getting sympathy for the fact that her workload was not fair, thus adding even a bit of emotional blackmail to ensure that Kitty didn't ask for the book.

Dion's use of the physical context was apparently aimless as he wandered around the notice board area for most of the 25 minutes. Should preferred peers such as Rhys move into this space, Dion would consult and chat with them. He did not appear to deliberately seek Rhys out for advice even though he prefers to consult with him. It appears that Dion moves round and then checks out what is available the space he is in. In this context the classroom space has also provided stress relief, in its affordance of social distractions and time out from trying to think of things. Dion may have also been using this strategy to look around and see what resources others had. This was demonstrated by his persistence in asking Selma three times for the book when he finally noticed she had it.

Dion was further inconvenienced by having to remain in the area of the notice board in order to refer to the task card, and use the poster displays as a resource. He was unable to sit down at a flat surface for writing, resorting to having to hold his book vertically against the wall in order to write in it. As has been demonstrated, the cumulative effect of these environmental factors prevented him from engaging in the task and contributed to his feeling of stress. Dion has a well-practised strategy for avoiding stress by avoiding hard work. It appears that Dion also uses this strategy in avoiding dealing with the difficulties in managing his environment.

Another variable within the physical context was the proximity of the computer, which they both found too loud. Dion found it hard to concentrate because of the noise, and he "kept staring at it". Dion unsuccessfully requested that the other children "turn the sound down or something". Dion was unable to prevent himself staring at the computer when it was too loud. This would prevent him from finishing his work, which predicted stress and anger, but unfortunately Dion appeared to lack the necessary verbal skills or self-confidence to insist that the environment be better matched to his needs. In contrast, Lois complained to the teacher about the volume, succeeding in getting the computer turned away from her. For Lois it was the fact that Dion, Edmond and others kept looking at the computer which was the annoying aspect.

Having been distracted, Lois was able to immediately return to her task engagement, while Dion took longer to do so. This appeared to be due to the antecedents to his distraction. Dion became distracted when he was having difficulty with ideas for writing down, these distractions frequently being preceded by frowning and gazing round, which was also a predictor of stress. Lois was focused on her writing tasks throughout many possible distractions. When she was interrupted she was able to quickly return to her task, having either reported the offender or made her own comments, for example, "shush!"

Socially, Lois does not "care" about anybody "I just care about my work" (Chapter Six). Therefore the optimum environment for Lois requires no annoyances from others and continued access to her resources. Dion seeks assistance from peers rather than the teacher and in this sense uses the full classroom environment. However he does not tend to obtain the most useful assistance, which negates the positive mood effect he might experience from social interactions.

The Instructional Evaluation System

From the data presented in this chapter, the teacher has demonstrated two important roles, namely presenter of the instruction-evaluation system through which the classroom goal orientation was unconsciously defined. She was also a mediator of the physical context. Through these roles the teacher has impacted the experience of each of the four individual children. This chapter has demonstrated individual differences in the frequency, content and emotion system effects of her interactions with each of the children.

Teacher's Role in the Physical Context

The physical organisation of the classroom space is under the control of the teacher, whose design of the desk arrangements and other furniture reflects her beliefs about what the children need in terms of supervision and peers close by or apart. As the previous sections have demonstrated, the arrangements of the desks, the task cards, the resources, the computer and juxtapositioning of individual children such as Abby and Joseph, have resulted in individual differences in the task engagement of the four target children. This has been the outcome of emotion correlates of the social interactions and access to resources afforded. The teacher has allowed children to choose working partners if they so wished, and the freedom to sit elsewhere other than their own desks. However, data presented in this series of chapters about Study 17, suggest that equal rights within this environment, are moderated through an individual child's positive emotions, social status, self-confidence, and the "luck of the draw" as to where a child might be seated in the first place.

This teacher had no idea that Abby was being bullied, and she was upset when she heard that this had been going on in her classroom. Abby's replies to the boys were not even audible to us as observers close to her, and were only recorded through the microphone. As Nuthall and Alton-Lee (1987) had also demonstrated in the earlier series of studies, violations of children's rights by other children occurs covertly. Therefore the observations put forward here are describing the classroom culture, norms and rituals that have been training the children over the few years even prior to Year 5. They are offered to inform teachers and more importantly those in charge of policy, to argue that appearances are not what they seem, and unfortunately some children's futures will be compromised because of that. In the busy active classroom, the subtle interactions that we have been able to record would have gone un-noticed had we not been there. Similarly without the mood slips and the interviews, we would not have known about Dion's stress.

The teacher also inadvertently moderated the physical context in that she circulated the classroom assisting children as required, based on her observations as she passed. Some children such as Joseph initiated interactions with the teacher. Sometimes the teacher initiated these. However the teacher might pass a child's desk at a time when she was not needed. Alternatively, children might not wish to make it obvious that they need help within earshot of peers. For example, when the teacher asked Dion and Robert "how are we going?" Dion might have been inhibited by Robert's presence at the notice board so that he might not want to ask for help in front of him. Recall from earlier evidence that he was very likely to be protecting his inadequacy (Lazarus,

1991), by telling Robert what he had done and Robert saying that it was "easy". Similarly for Abby – although we did not spend time with her in this chapter, we have enough data to predict that she would be putting herself at increased risk if she asked the teacher for help when Joseph was sitting right next to her.

There was ongoing movement similar to a dance hall as children went back and forth to the notice board, which meant that an individual child could easily avoid the teacher. While the teacher was circulating, the children were also moving round the classroom, which might impact the number of possible interactions available. The teacher did say to the observer on several occasions, "I'm not needed". Before we had the present data we would have agreed that the children appeared to be happy and engaged. But now that we have the present data, we cannot agree with that interpretation any more. In conjunction with the statistical findings, I would now be asking children if they were interested, curious or excited to find out whether they were engaged and learning. Previously I would have asked if they were happy. As we have seen, happy is important but is less significant for learning task engagement.

Table 9.4 summarises the teacher's interactions with the four target children during this morning session on Day 7.

Table 9.4

Summary of Teacher Interactions with the Four Target Children during Day 7 Session

Target Child	Content-Related Interactions	Organisational Interactions	Duration	Total Interaction Time
Dion	0	2	30s	1min
Abby	0	3	15s	45s
Lois	0	4	15s – 1 min	2min
Joseph	1 x 30s	6	15s – 1min 30s	4min 15s
Totals	1	15		8min

Joseph interacted with the teacher for a total of 4 minutes 15 seconds, while Lois, Dion and Abby interacted with her for 2 minutes, 1 minute and 45 seconds respectively (Table 9.4). Joseph's interactions comprised 53% of the teacher's total interaction time with the four target children.

This was more than twice the amount of time spent by Lois at 25% of the teacher interaction time. Dion and Abby interacted for 12.5% and 8% of the time respectively.

Apart from a single 30-second interaction with Joseph about content, all interactions were on organisation. Joseph interacted four times in order to obtain resources, and twice to check that his work was finished to the required standard. Lois interacted on one occasion seeking the particular resource she needed at the commencement of the session. Abby and Dion did not did not ask for resources. Lois spent a further minute attempting to re-negotiate her workload, and was unsuccessful. Her remaining interaction was to report the annoying behaviour of Edmond and get the computer turned round.

The teacher asked both Abby and Dion how they were going, and on each occasion they responded with minimal utterances without the teacher actually seeing their work. The lower rate of utterances by Abby and Dion might reflect their reluctance to confirm they need help. Help-seeking has been interpreted as a low ability cue by children in this age group (Graham & Barker, 1990). Hence it might be preferable to respond to the teacher that things are "yep", "mm" (Abby) or "good" (Dion).

Joseph was the only target child who interacted with the teacher about the content of his task. Joseph showed the teacher his postcard, and she gave both organisational and content feedback, during an interaction of 1 minute and 30 second's duration. Content feedback comprised the teacher confirming two facts included by Joseph, namely Saturn being the 6th planet from the sun, and her reading aloud that, "you cannot stand on it (Saturn)". During this interaction both Joseph and the teacher laughed. The procedural or organisational feedback given to Joseph by the teacher was to proof read it for punctuation, and to put a coloured border round it using a ruler. The purpose of the border was to "make this even more interesting". The teacher twice referred to Joseph's postcard as "awesome". The teacher appeared to be in rapport with Joseph, as demonstrated by her own use of language with him. Joseph's interactions with the teacher did not appear to differ from his interactions with peers. To this extent, the teacher was another social resource for him, as well as a provider of the materials he needed. Early in this chapter we saw that some children sought assistance from the teacher in relation to the Sea of Tranquillity task. Not seeking assistance from the teacher and having no success negotiating with Adele had a negative impact on Dion, setting up a chain of negative events as antecedents to specific events in his ongoing experience of stress.

Classroom Goal Orientation

Throughout this chapter as Dion's and Lois's individual experiences have been analysed, it has been argued that the teacher has continually reinforced a performance goal orientation (Ames, 1992). The nature of the interactions presented confirms the weighting of the dialogue towards finishing the task/s currently underway in order to get on with the next tasks. For example the teacher *dis*couraged Dion and Katrina on separate occasions from spending too long either searching for information for, or working on a task. To Abby and Dion, the teacher said, "good girl (or) boy", in response to Dion saying he was " almost finished", and Abby saying that she had "finished". These affirmations confirmed the performance goal orientation (Ames, 1992).

This also applied to the teacher's discussion with Lois about her workload. Rather than look at the amount and/or the content of the work she had done, the teacher was more concerned about the number of tasks completed and keeping Lois occupied. When Lois attempted to re-negotiate her "unfair " workload, the teacher drew the interaction to a close by changing the subject saying, "well done. Where did you get all this information?" Lois explained and the teacher said, "good girl. Well done". Following this event Lois demonstrated an increased rate of annoyance at her peers. The absence of any performance criteria (Chapter Six), in conjunction with the teacher's verbal reinforcements for finishing confirmed the performance goal orientation (Ames, 1992).

Discussion

This chapter has demonstrated the unique and diverging different experiences of mainly Dion and Lois during Session 1 Day 7. I have analysed in detail their ongoing task engagement with close attention to the antecedents to their task engagement and their emotions as reported through ESM or video-cued interview. This was necessary in order to determine whether task selection on the basis of fun or enjoyment predicted ongoing engagement in the task.

Individual differences have been demonstrated in their specific emotion responses, which has resulted from their unique emotional conditioning history in relation to the range of environmental variables or stimuli encountered through the four classroom contexts (Nuthall, 2000). This in turn has resulted in individual differences in task engagement.

There were some similarities in experiences. With reference to my proposed model of decision making this chapter has also demonstrated that the instruction –evaluation system and physical context have had similar effects on both children. Through its implied performance goal, the instruction evaluation system - mediated by the teacher, has fostered a performance goal orientation in each of the children. Therefore both Dion and Lois had performance expectations of finishing a certain number of tasks.

In order to complete the tasks, the children (as well as the other children in the class) required access to resources. This appeared to be the most relevant aspect of the physical context, in its impact on the individual children's emotion system responses. Although it was a stimulus in common, this resource requirement resulted in individual differences in emotions experienced and in their use of strategies to deal with it.

Lois minimised her risk of not achieving task engagement by securing her resource. Her behavioural history in the classroom has trained the rest of the class to support this goal. Therefore she was generally happy and interested and had confidence that she could obtain any resource she needed. When she was interrupted in her performance goal, she became annoyed, but could deal with the annoying stimulus to bring her back in to a positive emotional state. Dion did not have the skill of knowing what resource he needed, let alone securing it. Therefore he tended to become stressed, which then predicted avoidance of the particular task and thinking about something else. However, in Chapter Seven the data showed that Dion did the same thing as Lois, when he secured the "cool facts" book early in the unit. He kept this book in his desk, and was able to read it mainly during silent reading. Compared to when he tried to get the book for this task, Dion may have been more creative and anticipating in his problem solving, due to being in a positive state at the commencement of the unit. Isen et al (1987) has shown that being happy facilitates problem solving, and this may well have also contributed to Lois's success in her problem solving. Dion did not use the cool book on Day 7, and it is not clear why. Apart from this one cool facts book (Usborne book with cartoons) on the previous days, and the book he would have like Selma to let him use, there did not seem to be any other books of interest to Dion on Day 7.

In the previous chapter I have argued that irrespective of the individual differences in relation to the full range of factors associated with choosing tasks or making decisions, the children selected tasks based on their perceived level of fun or enjoyment. Across the four target children, the

Factor 2 emotion of interested was a correlate of fun in the choosing context. My analysis of two target children's experiences during one morning session, demonstrated that task selection on this basis does not necessarily predict ongoing task engagement. In addition to their individual strategies for coping with resource difficulties, the children were continually confronted with a range of stimuli, each of which amounted to an adaptational encounter. Where these adaptational encounters resulted in positive emotions they predicted task engagement. Where they were negative they predicted off task behaviours, intermittent task engagement or selection of a different task.

ESM data collection has confirmed the individual differences in experience within a 5-minute time frame. This chapter has demonstrated the unique histories of or antecedents to Dion's and Lois's emotions as reported in the data, confirming that their emotions reported were consistent with the events of the morning in each case. Interview and transcript data presented in this chapter has also demonstrated that these emotions have changed throughout the session and that should mood slips have been handed out at a different time, it is possible that a different range of emotion data might have been yielded.

In the absence of any other data, the ESM data alone would provide the researcher with a diagnosis of the individual experience at any given time. Just as a temperature reading at any given moment will assist with a diagnosis as to current health, an emotion reading provides evidence as to the well-being of the three functions of the mind (Snow, Corno & Jackson, 1996). How well the three functions are working together for the optimum behavioural response appears to be expressed through this emotion diagnosis. The emotions being experienced at any given time inform us as to how well each child was getting along in their world at that time (Lazarus, 1991). We have seen that both children had to cope with their unique or individual mini-contexts, which is mainly beyond the awareness of the teacher (Nuthall, 2000). Using the mood slips in conjunction with the appropriate diagnostic interview question might have elicited from Dion for example, the important information that he needed the book to get on with the task. This was why he was stressed, and did not know what to write. Lois may have circled negative emotions if she had been given a mood slip at the time she thought it was unfair that she had to continue. However, Lois did say to me in her interview that she would not tell the teacher if she was feeling embarrassed, but she did tell the teacher when she was annoyed about other children.

In summary, when comparing the experiences of Dion and Lois, it appears that irrespective of their differences in achievement and tasks chosen, they have demonstrated similar core relational themes (Lazarus, 1991) for their emotions. They both did not know what to write when they did not have the book. The only reason it led to stress for Dion was that he did not get the book. Because he has become used to being stressed in this sort of situation, his learned bias (Jenkins & Oatley, 1998, p. 46) predisposed him to avoidance of this rather than creatively trying to work something out with Selma so that he could actually get the book. In contrast, Lois has learned to assert her needs, which means that at the first sign of annoyance at not having what she needs, she works towards getting what she needs.

They both felt annoyed about the computer noise. Lois sorted it more quickly than Dion who got angry because he could not sort it. They both were concerned about the number of tasks completed, and they both talked about it with others. In doing so they both protected their adequacy, the difference being in the levels of adequacy. Considering the "Matthew effect ... [in that] the gap between the achievement levels of high and low achieving children widens steadily as they move from one age level to the next" (Church, 1999, p. 80), we can already see that Dion's stress experience will not be helpful if it continues. If these kinds of experiences continue to be repeated, it is likely that these two children's directions in learning and future opportunities will separate exponentially.

This chapter concludes the analysis of the four target children in Study 17. The graduated process of analysis through the anatomy and physiology of one decision, through to the moment by moment experiences of children during a single session have demonstrated that both high and low achieving children were equally capable of learning and engaging in tasks when they are interested and happy. Further, I have provided evidence for similar core relational themes for the negative emotions – across the highest and lower achievers. What is making the difference to the frequencies of these occurrences is the way that classrooms and lessons are structured. Nuthall (2000) has argued that the classroom is shaping children's minds. These findings would also suggest that the classroom is doing this through shaping children's emotions. The title of this chapter was "Rules of Engagement". The first rule of engagement would seem to be that irrespective of ability, the child has to have the resources and the scaffolding they need in order to maintain that initial interest, curiosity and excitement that they had when they first chose the task.

In the next chapter we shall briefly take an overview of the emotions reported by the wider sample, to see whether the findings from the two classrooms of Studies 17 and 18 might be generalisable to the other classrooms.

CHAPTER TEN: THE EMOTION FACTORS – WHAT THE CHILDREN SAID

Interviewer: What words (off the mood slip) would be best for you to be in a learning mood?
Ned: Probably interested, excited and fun.
I: And how often would you have that all together at once?
Ned: Oh not very often (laughs).

In this brief excerpt, Ned has almost defined the Factor 2 emotions of interested, curious and excited. He has differed only by saying fun rather than curious. Ned's reply is consistent with the correlates of the four target children from Study 17 analysed in the previous chapters. Ned was one of the target children from Study 18. Recall that Ned also reported the most frequent occurrence of interested of the four target children in Study 18, as well as some occasions of ambivalence when he reported interested and bored (Chapter Six).

In this chapter, I shall briefly report what Ned and the children from the wider sample overall (Studies 13 – 18) have said about the emotions identified as significant, with particular attention to the role of interested. I acknowledge that my thesis has already provided reliable evidence as to the importance of interest, through both the quantitative and qualitative analyses so far. However, as stated in my first chapter, these children had a strong desire to inform my research on their emotions, and now that I have your attention, I cannot conclude my thesis without allowing their contribution. In addition, the teachers have also offered their perspectives providing a further form of triangulation of one of the more significant findings from my research. This chapter will begin with a brief review of the factors obtained, followed by interview data from the wider sample of children from Studies 13 to 18 about the significant emotions as obtained through the factor analysis (Chapter Five). I shall conclude this chapter with evidence from children and teachers on whether school should always be interesting.

Bearing in mind that the statistical findings as to the most significant emotions for the present sample were only recently computed, Ned's interview data above pre-dated the factor analysis by four years. Therefore at the time of our conversation the present factors did not exist in their present form. Similar to Rod's prediction about the most common emotions we could expect (Chapter Five), Ned has intuitively defined the most significant emotions for learning.

One of the main findings from the statistical analyses (Chapter Five) was that the factor analysis obtained two distinct clusters of negative and positive emotions as Factor 1 and Factor 2

respectively. The Factor 1 emotions comprised the negative cluster and the Factor 2 emotions were interested, curious and excited. Factor 3 correlated with Factor 2. Despite the aggregated data demonstrating no significant relationship between children's concept learning and the Factor 2 emotions, the qualitative findings have demonstrated that at an individual level these three Factor 2 emotions were correlates of either successful task engagement or successful learning. This apparent contradiction would not surprise Lazarus (1991) or other researchers cited earlier in my thesis. As discussed earlier, aggregated data analyses might mask individual differences.

Factor 2 emotions were positively related to PAT Maths achievement. Happy was found to be a separate and less important factor yet it was positively related to the Factor 2 emotions (Chapter Five). However, happy was the most frequently circled emotion on 48% of the mood slips, followed by interested at 35%. Excited and curious were circled on 24% and 19% of the mood slips respectively. Therefore the co-occurrence of the significant Factor 2 emotions - interested, curious and excited, was unlikely to be very frequent overall and could be no more than 19% of occasions sampled, despite its significance.

The separation of Happy from the Factor 2 emotions suggests that feeling happy was a different type of experience to feeling interested, curious and excited. If that is so, then these two factors might represent two different types of adaptational encounters (Lazarus, 1991) occurring as a result of different appraisals or different environmental variables. However, the significant relationship between Factor 2 and Happy indicates that although they might have occurred separately and might be different experientially, they were also significantly likely to co-occur. Having demonstrated the salience of the Factor 2 emotions at the qualitative level, along with the many environmental variables associated with these, it would perhaps be appropriate to conclude my thesis with the children's opinions as to the importance of these emotions.

During their video-cued interviews, I invited each target child from Studies 13 to 18 to give me examples of when they would usually feel certain emotions in school. As described in detail in the methodology chapter (Chapter Four), these examples were obtained by giving the children a list of emotion words (Appendix 3, p. 455), which they would read through orally, and then recall a time when they had experienced each emotion word in school. They were also told that the first example that popped into their heads would be the best example. Since then, having determined the most significant emotions through the factor analysis, it might be useful to compare these self-

reported examples to the significance found statistically. The wider sample included the target children from the six studies between Study 13 and Study 18 (Chapter Four).

I shall start with the positive emotions first. While they contributed less to the total variance overall, they are the emotions we wish to foster. The children's responses were sorted for examples that related to either academic contexts, such as specific curriculum topics or non-academic contexts such as lunch break, within the broader context of school. The results are reported in Table 10.1.

Table 10.1

The Numbers of Children Providing Contexts for Positive Emotions

Emotion	Academic	Non-Academic
Interested	19	1
Curious	4	4
Excited	5	11
Happy	11	9

Note: n=20

Twenty children were invited to give examples of when they felt interested in school. In response, nineteen children gave academic or curriculum related examples (Table 10.1). For example, Justin's (Study 13) example was when he was doing Maths, Nellie's (Study 13) was Art, and fourteen children gave their example from the specific topic being studied at the time for the Project on Learning. This might also denote a memory recency effect. Justin also gave Maths as his example for happy, as also did Nellie with Art, both these children indicating a co-occurrence of happy and interested in their preferred academic domain. Tyler (Study 14) was also both happy and interested when he found out he could research his own country of origin for his classroom's Migration Study. Dion did not know when he would feel interested, but would feel happy either when reading or going home from school. Previous data from Dion suggest that the relaxation he experiences and the visual nature of his preferred reading material contribute to his understanding of written language.

There were fewer examples of academic contexts for happy than there were for interested. Of the eleven academic examples for happy, eight children gave different examples from those given for interested. For example, Elle's (Study 16) example for interested in the "Keeping Ourselves Safe" video and her example for happy was "when we were doing boats, and our boat was going about 2 k, about 1k per hour, just about that fast". (This was part of a science experiment that had been

conducted in Study 16). Other non-academic contexts for when children felt happy in school included the following:

- lunch-time (Cathy, Study 14; Beth, Study 16);
- playing (Harriet Study 14; Rhys, Study 17);
- being outside or doing easy work (Jack, Study 16);
- "when someone was helping me" (Abby, Study 17);
- sport (Kitty, Study 15;Todd, Study 14);
- being with friends (Kellie, Study 15);
- "when I went up a spelling level"(Lois, Study 17).

For excited, there were five examples of an academic context, three of which came from Study 16 where the children had been conducting "kitchen chemistry" experiments in the classroom. For example, "chemical pop guns" involving fizzing up of baking soda and vinegar in a bottle until the lid popped off, was both exciting and interesting for two of the children in Study 16. Kellie said that she tends to feel excited as well as happy sitting on the mat wondering "what she (the teacher) is going to talk about". Kitty said she feels excited with "certain teachers, it's really fun". Lois said she feels excited "when we're doing something that I want to do". Four children said "no", that they could not think of an example for excited in school. The eleven *non*-academic examples for excited included five examples relating to sports or some sort of activity, one trip, one birthday coming up, and one visit to the fair. These exciting events were in mind while at school.

Jack and Dion did not know the meaning of curious, and seven children could not give an example of feeling curious in school. Only four children gave an academic example. The academic examples included two children (Mike and Kellie; Study 15) finding the same academic content both curious and interesting. Tyler said that curious was the "same as interested" and Nellie said she feels curious "when the teacher's got this book that is covered up with something and you want to look at it".

Overall and in general these results are consistent with the possibility that happy and interested may have separate objects and may be different experiences. They also show that when the children reflected on the specific Factor 2 emotions as part of a long list of words, only a few actually linked these emotions to other examples for interested or happy. However these results

from four classrooms are consistent with the Factor findings from the two classrooms, which suggests a potential relevance of these factors to elementary school classrooms in general. From the children's explanations, individual differences in their preferences and attributions are also evident in their reports about the finer details about their experience. Finally, these results also remind us that in a minority of cases when the mood slips were circulated, some words such as curious might not have been circled if the children did not understand their meaning.

Lazarus (1991) explains that "although, happiness is notorious for arising from diverse causes in different individuals, it has one simple core relational theme, which is that we have gained or are gaining what we desire (in other words) when we are making reasonable progress towards our goals" (p.267). Lazarus adds that it is only against a generally positive background that such realisation will induce happiness, otherwise making such progress or positive events "will have little power to please" (p. 267). The children's examples for happy above are consistent with Lazarus's diversity, with a wide range of examples being given. Lois has indicated an achievement component, which might also reflect realisation of a goal to be improving in spelling. From the cited examples alone it is not clear whether the children's examples of happy reflect a general positive background emotion or actual realisation of goals. The examples given tend to suggest that they experienced happy as a dependent variable. It was a consequence of some type of positive event.

Goal congruence (Lazarus, 1991) being realised in the above examples might include getting a break from class, being involved in something more important such as sport, social goals (being with friends), or actually being able to do the work (getting help, or finding the work easy). Finally, feeling happy might also equate with doing something you enjoy. Some children said they feel both interested and happy while engaged in specific curriculum topics, while others feel happy when there are less taxing academic requirements such as reading or art or doing something novel like the kitchen chemistry. Having got to know Abby already, the reader will no doubt find her example as very poignant.

The Factor 2 emotions comprise Lazarus's (1991) non-emotions, so he does not offer core relational themes for these. Curious and interested have been explained by Lazarus (1991) as cognitive states with some arousal, "waiting for evidence on which appraisal of personal significance depends" (p. 83). Of the children who understood the term "curious" and who could provide examples, four of them linked curious with interested, consistent with Lazarus (1991).

Nellie's explanation for curious above was consistent with Lazarus's (1991) "watching for evidence". The children's explanations for excited were positive rather than negative, irrespective of whether they were academic or non-academic examples. This trend was not consistent with Lazarus's (1991) explanation that excited "as well as upset, distress, nervousness, tension and agitation ...are apt to be used in the context of stress rather than for identifying a particular emotion with a particular context" (p. 83).

Having compared the examples of positive events with the Factors 2 and 3, the Factor 1 emotions were also sorted and the results are presented in Table 10.2.

Table 10.2

The Numbers of Children Providing Contexts for Negative Emotions

Emotion	Academic	Non-Academic
Bored	14	4
Angry	1	14
Stressed	5	5
Sad	5	6
Nervous	8	9
Embarrassed	7	6

Note: $n = 20$

When the twenty target children from the wider sample were asked to give a school-related example for the negative emotions listed in Table 10.2, there were fewer examples elicited compared to the positive examples (Table 10.1). The most frequently reported academic context was found for bored, followed by nervous, embarrassed and stressed. The emotion most frequently reported in non-academic contexts in school was angry, followed by nervous, then embarrassed and sad. The non-academic examples for bored included three of "nothing to do". Lois said, "when we do something that I don't like". These might almost be academic in that they refer to features related to the academic context.

The academic contexts for bored included work that children already know or have done before, work that has gone on too long, the teacher "burbling", or "blabber(ing)", or specific curriculum topics such as spelling, handwriting, or maths or reading, depending on the individual child. Boredom has been analysed separately and is beyond the scope of this work, but will be published later. The experience of boredom appears to be the opposite to the experience of Factor 2 above. From the correlations (Chapter Five) we know that this sample did report some significant ambivalent correlations such as bored and interested.

School context examples for angry were skewed non-academically with the non-academic examples all reflecting social infringements in school. Examples include the following:

- "When someone takes something from you like a pencil" (Elle);
- "When people annoy the (giggle) out of me" (Rhys);
- "When I had a bad playtime (and) with people if they didn't sort of agree with me" (Kellie);
- "When Jacob kept copying my work" (Tyler).

Being unjustly told off by the teacher was a reason for Cathy (Study 14) and Edith (Study 13). Lois gave the only academic related example but which still reflected annoyance with others. Lois explained:

> "While I was doing something really interesting and I wanted to find lots of things but like people kept on asking me questions and saying things to me... Sometimes like when I'm trying to ask Mrs. L. something... and sometimes if I miss work cos that happens a lot to me cos I have violin lessons Tuesday at class times" (Lois.)

Academic contexts for nervous included six children giving examples of making a speech or presentation in front of the class. Tyler gave the example of a test, and Kellie would be nervous "when I was just sort of taking a guess". Academic examples for embarrassed included events of being singled out in front of the class such as when a child had made an error that was made public. For example, Elle explained, "sometimes when the teacher calls out your name and asks you why you think somethink (sic) in front of the class, and I do something wrong like I say a wrong word in my speech". Kellie feels embarrassed getting something right "when everyone stares at me". Cathy and Harriet (both Study 14) both said it was like being ashamed which happened when they got the wrong answer in front of the class and everyone laughed.

Getting the wrong answer was the type of event that Kellie would find sad. Other academic examples for sad included having to stop doing something enjoyable or interesting, losing a work-sheet you might need, "when she (the teacher) tells a sad story" (Nellie), or even "just going to school" (Justin).

Stressed yielded equal numbers of academic and non-academic examples. Lois, Dion, and Kellie would feel stressed when they can't do the work. Cathy gave her example as, "sometimes you

feel stressed, well the teachers can get stressed quite a lot like if there's a room full of screaming children you can get quite stressed out".

Of the negative emotions included above, anger and sadness have been included by Lazarus (1991) and therefore have core relational themes identified. Ashamed is on Lazarus's (1991) list, with similar themes to embarrassed as acknowledged by two of the children above. Lazarus's (1991) core relational theme for anger is "a demeaning offence against me and mine" (p. 122). Shame's core relational theme is "having failed to live up to an ego-ideal" (p.122). Although "shame" and "shamed out" were on the original list of emotion words, they were not included on the mood slips. For this comparison, only those words included on the mood slips are relevant, because we are comparing the children's interview data on the specific emotions with those obtained in the Factor analysis.

The children's examples of contexts for anger were consistent with Lazarus's (1991) core relational theme for anger, and also reflected the goal incongruent aspect of negative emotions. When we are blocked from progress towards realisation of our conscious or unconscious goals, anger "one of the most powerful emotions" (Lazarus, 1991) will result. Social factors were included in the contexts of anger for the children, through for example other children copying work, taking a pencil, or being annoying in some way.

Similar to the findings of Prawat and Anderson (1994) peers can be bothersome when children are trying to work, although having a reciprocated friend in school is an important factor in reducing emotional distress (Wentzel, Barry, & Caldwell, 2004). For example, Edith (above) was angry at being told off by the teacher, because it was her best friend that had committed the offence. However Edith likes having her best friend sitting next to her because they wait for each other to complete their work. As Edith explained, "you just like to keep up with people and not be behind or anything so if I'm behind or ahead of somebody I like to have somebody that's with me that can come up to the teacher with me and... like if I've finished or I haven't finished and I get in trouble I've got somebody else there". Edith also said that the teacher is "really nice when me and Kimberley are there (because) she has us on and that".

The children's examples for sad were not as obviously consistent with Lazarus's core relational theme of "having experienced irrevocable loss" (p. 122). However, they did demonstrate some loss. Justin's global example of just being at school might be interpreted as loss of more

interesting things to do based on other interview evidence. For example, Justin has a strategy that he said he tries out most mornings to avoid "another boring school day". His strategy is to try and fake a high temperature. However, when this information is considered in conjunction with his examples of feeling happy and interested in maths, we can see that there are some occasions when Justin would not feel sad in school. Proportionally, these happy and interested events are still less than the amount of time Justin would feel bored, which he calculates as being "75% or 60%" of the average day.

From the negative emotions presented in this section, we can see that the children's interview data on the cluster of emotions in Factor 1 confirm that these are different types of experiences to the positive clusters. These examples were obtained in response to a full list of emotion words or stimuli. The children had to find an example from memory. Other methods were also used in the video-cued interviews, including the video-clips and a series of cloze statements. These methods elicited other examples (some of which were more specific) consistent with these, of when these emotions might occur, as demonstrated in the qualitative analyses so far. What this particular series of comparisons has done has been to confirm the types of contexts for these specific emotions and confirm their subjectively different experiences.

There were individual differences in the finer details of the children's own relational themes articulated in their attributions about when or why they might feel certain emotions. However these comparisons have also shown that the children have been able to identify core relational themes for specific emotions generally consistent with Lazarus (1991). Finally, consistent with the Factor results, the children's interview data suggests that they can and do discriminate between the learning oriented emotions in Factor 2 and Happy, confirming interested as being related to academic or curriculum, and happy as being more general.

We have also seen that for some children happy and interested would be likely to occur in specific curriculum areas, but with individual differences in which curriculum areas these would occur. The qualitative data also gave some support to the finding that Factor 3 might predispose Factor 2. For example, Rewa's persistent reports of happy appeared to predispose her to experiencing Factor 2, while her reports of happy irrespective of which other negative or positive emotions she also reported confirms that Factor 3 Happy was a different experience to Factor 2 even though they might co-occur.

So far the statistical and qualitative findings, now supported by these interview findings strongly point to the importance of feeling interested curious and excited at school. What do the children think about that?

Should Schoolwork Always be Interesting?

Seventeen children were asked this very question, "Should schoolwork always be interesting?" Thirteen children said "no", three children said "yes", and one child said, "maybe". Beth said "Yeah I think it should because otherwise it would be boring and I wouldn't do as well I don't think at school". Rewa explained:

> Yep it should be pretty important because if it's not that interesting um we just don't care about our work. (When something's interesting) you feel like you want to carry on with what you're doing (Rewa, Study 18).

Rewa's reasons are consistent with her qualitative evidence in that when she was interested, curious and excited she was reading and learning new material (Chapter Six). The reasons given by the thirteen children who thought school should not always be interesting were collated and sorted into five broad categories and the results are reported in Table 10.3 below.

Table 10.3
Children's Reasons Why School-work Should Not Always be Interesting

Reason	Number of Students[a]	Percentage
Boredom equates with learning something new	7	54
Boredom balances the school experience	3	23
Contrary to expectations	3	23
Too much interest can become boring	2	15
Boredom teaches patience	1	8

[a] $\underline{n} = 13$

Seven of these children explained that boredom is integral to learning new information (Table 10.3). They explained that unless school was boring some of the time, they would not be learning anything new. Kitty explained that "You shouldn't just do interesting things, you should do things you don't like so you can learn (because you may never get another chance to learn things you learnt at primary school)". Joseph thought that, "They've gotta make some things boring so you actually study".

Three children described the necessity for boredom to calm people down and balance their experience particularly their physiology.

> Jeff: Because you can do some things that you would like but then you don't want to get them too excited or anything. For about 70% of the time. A lot of people just go all crazy.
>
> Joseph: If they're too happy, well then they start to get a bit silly, I'd make them not bored but not too silly
>
> Tyler: No get something boring just to calm them down. They might get over excited. Pretty soon you'll run out of interesting things so you need both to keep a balance

Tyler's expectation included the belief that there might not be enough interesting things to supply a full day of interest, so that having a balance with boring material ensures that the supply of interesting material is not depleted. There is also a suggestion in these responses that boredom might correlate with relaxed. As reported in the correlational results, (Chapter Five, Table 5.5) there was a significant within-subjects correlation for relaxed and bored, but no correlation between-subjects. This indicates that occasionally some children reported these two emotions at the same time. Tyler also explained his theory of balance with a metaphor of balancing scales.

> Imagine you had like a pair of scales, and there was one excited weight and there was a boring weight and some weight was more heavier, and so you put it on the scales and um boring would go up and excited would go down. So that would be more proper and you wouldn't get excited. Well then you'll need to get a like amount of boring weights to get the balance (Tyler).

Three children thought school being interesting would be contrary to expectations. For example, Ned thought it would be "unlikely". Kellie explained,

> If you think about it, it just wouldn't be right – it's just this feeling I have I mean I just think nothing would be normal if you always felt exciting excited and interested about everything. (Kellie)

Nellie and Cathy said that if things were interesting all the time that would actually "get boring", and "you (would) get used to them". Todd explained in detail that "You need to learn patience".

> Don't just always do fun stuff do boring stuff as well. Fun things go fast And then you'll want everything fast. Doing boring..feels long see like that you've got to have patience...(if) you have patience, cos you already know how to do things the long way.... The cheesemaker ad (Todd).

Todd has also talked about the time going quickly when you are having fun compared to when you are bored. It was noteworthy that when I used the word "interesting" a number of the children translated that to "fun". This was consistent with the task choice data from the target children in Study 17.

In summary, the majority of the children who were asked this question have argued that schoolwork should not always be interesting. These responses appear to conflict with the findings presented thus far. Data presented so far indicates that feeling interested is a desirable state and fosters learning. This apparent contradiction was explored with Ned and Rod, and excerpts from my interviews with them are presented below.

Interviewer: Do you think school work should always be interesting?
Rod: Not always but most of the time it should be.
I: Why shouldn't it be always?
R um Cos like most boring things you learn more from them.
I So you usually learn more from the boring things.
R Yeah kind of but then like you learn quicker when you're interested.
I Yeah that's..
R So it's kinda weird.
I It's weird isn't it? Yeah let's think about that. Yeah cos it's harder to learn when you're bored, but you're saying that you have to have some stuff that's boring.
R mmm
I And you don't think that everything would be interesting all the time.
R: mm
I Think about some of the interesting things that you have learnt. Have you learnt from interesting things?
R Yep
I Yeah so yeah and yet you don't think school should be interesting all the time.
R Yeah it should be interesting most of the time but you need a little bit of boring stuff.
I Yeah so if we think about that again having just talked about learning from interesting.
R mm
I What would be the thing about the bored that makes you think that you need a bit of it?
R um Cos like it's got more facts and that like interesting things. I don't usually learn you're not cos like don't usually make you learn as much
I Right
R It's more fun so you learn to do the things to do to make you learn quicker much quicker. Just do them quicker.
I Yeah ok well, that means that you're saying you have to have boring stuff. What should people do to the boring stuff to help you learn it?
R um Nothing you just need to like make it um need to shorten it a bit (Audio-tape 086).

I OK Shorten it, yeah.
R Yeah try and make it just a little bit more interesting.
I A little bit more interesting
R mm
I Yeah so interesting enough so you could learn it but not..
R mmm Too interesting.
I Not too interesting. Cos it sounds like you're saying some of that too interesting stuff has not got a lot of facts in it or something.
R mmm Yeah cos it's like interesting stuff. You don't need much of it cos it's like playing round and that.
I Right. So have you ever had an experience of learning facts that you found interesting?
R mm Yeah just like you just learn interesting facts.
I Yeah yeah, so when you're learning interesting facts would you be bored then?
R No.

Summary of Rod's Theories

Rod does not appear to believe that he learns as much from interesting things as he does from boring things. He appears to believe that boring material contains more facts that he should be learning, yet we should try to make it a bit more interesting in order to make boring things easier to learn. He has taken note of this contradiction, which he noted is "weird".

Rod's suggestion that the time be shortened is consistent with his reported experience of getting bored when he has to sit and listen for long periods of time. The qualitative findings presented already have also implicated time as a factor in perceived ability because smart children are quicker at their tasks. This skill of being smart might also mean that there is less risk of being bored. This would make sense, because who would choose to get bored by taking too long? Rod has also suggested that you need to learn ways of learning boring material quicker. He initially equated interesting with fun, and eventually confirmed that he does find some facts interesting. Previous research on boredom has also demonstrated a perception of time going slowly in boredom (Watt, 1991).

Conversation with Ned about Whether Schoolwork Should Always be Interesting

Ned's arguments were similar, some of which are abbreviated below:

N : Oh cos you can't really make um school a hundred percent fun.
I: Right, why not?
N: Um because you wouldn't really learn as much and yeah.
.....
I: Right, so just let me get this right there's sort of a feeling that when things are boring it's harder to learn is that right?
N: Ah yeah when they're fun um you're having fun and you probably learn more.
...
I: So I wonder why people think that they wouldn't learn as much if it was fun all the time?
N: Um just because like you *have* to learn them and can't be all easy.

Summary of Ned's Theories

Ned has also explained that you have to have boring content in order to learn. His explanation suggests that work you have to learn is not easy. Ned clarified that hard work can be either fun or boring. Like Rod he recommends that boring work should be made interesting to learn. His reference to not all being easy, might reflect a desire for some challenge, but this was not explored.

Interpretation of These Hypotheses

Rod and Ned have proposed similar theories in response to the questions attempting to understand the apparent contradictions. Ned and Rod have indicated that work that is boring is more difficult, tends to be compulsory material and is a necessary part of the curriculum. However, they have both suggested that boring material does need to be made more interesting to facilitate learning. Both boys have also incorporated fun as being a correlate of interesting. Fun appears to have two definitions, either not related to learning, or facilitating learning.

These conversations confirm the complexity of and similarities between these two individual children's cognitive processes in relation to their experience. These excerpts demonstrate that the contrasting category to interesting is "boring", their definitions of which incorporate other features, such as level of difficulty and a compulsory purpose of the specific material. Boring material is a necessary part of school, but needs to be made more interesting or fun. This will make it easier to learn.

Why is it that children expect necessary "stuff " to be boring? A possible explanation may be found in when we hear what their teachers had to say. I asked teachers some questions about children's experience of boredom in class. These teachers were very interested in exploring the issue of children's boredom. Similar to my own experience described at the beginning of my thesis, we really hope our students are not feeling bored during our classes.

Teacher One

Interviewer: When students are bored, how do you get feedback? Have you ever had verbal Feedback from students about when they are ever feeling bored, or think something's boring?

T I haven't had that. I do take my *able learners* and talk to them ...on a one to one basis at the beginning of the year, and say to them if I give you anything that is too easy..if you're bored with what I'm giving you then please come and see me so that I know. Until you tell me I don't know if what I'm giving you is too easy for you. And I haven't this year but in the past I have had students come up to me (and tell me this is too easy).... And I can do something about it.

I would hate to think that any student is bored in my class and if they were bored Yeah.. I just hope that they are not bored, because it would only be hopefully the *able students*. The others should be coping with the work and if they're bored then that's my fault again because obviously the programme is not grabbing their attention. So they probably could be those students who are off task you know because they're bored with the work.

T unfortunately sometimes it's topics you *have to do*, it's maybe not what you want to do. And is that because *you* (meaning herself) are not presenting it the right way to the students. You don't want to do it yourself. You have to do it and so you haven't come up with an interesting way of presenting it so that the students will be empowered to learn it. I think a hang of a lot is on the teacher's attitude.

It was interesting that Teacher One expected that only the high achieving children would be bored, and these are the children who have been given permission to let her know. This teacher also indicated that if the teacher herself is not interested in the material this might have an impact. She has also implied that some compulsory curriculum topics might be boring.

Teacher Two

T I always pick up on it, I will always answer. Now it might be a formal language time, you know I think it's a bit boring too, but ok this is what I have to teach you. It's part of the curriculum because here it is. I have to teach you. When we get through this then we can get back on to something else ... so try and explain it in those terms.

Teacher Two's explanation is similar to Teacher One's, in that she has identified compulsory topics. Both teachers' explanations are consistent with how Rod and Ned have linked learning new compulsory "stuff" with not being interesting. This teacher has also included the idea (Premack's Principle), that if we get this over and done with we can then get onto something else. Like Teacher One, Teacher Two also gave permission to her higher achieving students to let her know if they are bored. However, interview data from the wider sample indicates that the majority of the children would not actually be prepared to tell the teacher if they were bored. Reasons included there being no point, or as Ned explained the teacher would probably say, "Do you want to go to Room 1 and do something fun? Something like that". (Room 1 refers to the new entrants' class.)

Interviewer: I don't know what that means does that mean..?
Ned: like do you want to go to another classroom you know
I: is that to help you out
N: no (laughs) just to basically say well tough luck

Teacher Three

Teacher Three explained:

> um and yet there are others you know your really capable ones who although you know you're setting the scene for everyone. I think they're probably sitting there and saying hmm been there done that I'm bored
>
> Now even if you've set them off on a little topic of their own, and again for some it's a catch 22 for me.I think it's a catch 22. There were times this year when I had set an activity for some of the *brighter ones* to go off and do and yeah they'd sort of come back and say they had done it but they hadn't done it properly because they were so used to just getting it done fast anyway.

Teacher Three has also identified the more capable students as more likely to experience boredom. She also acknowledged that the reason the more able children might be feeling bored, might be because they have done that topic before. However, any child irrespective of their achievement might have done a topic before. This suggests that high ability may be being associated with prior knowledge, rather than ability. This teacher has also identified the prevalence of children getting work done "fast". From the present data, the children might be intentionally doing the task quickly – to prove that they are smart or to prevent themselves becoming bored in the task. As stated by the Study 17 children, being quick equates to smart.

The three excerpts above from three different teachers from three different schools also demonstrate their remarkably similar approaches to their higher achieving students. High achievers have permission to get bored. These findings were supported with similar data from a class of Diploma in Educational Management participants in 2002, whom I also asked this question.

Finally, these teachers might also have provided a further clue as to why the high achieving children were more likely to report the Factor 2 emotions. They have been given permission to modify their academic content if they are bored with it. This might give them the edge when it comes to having a sense of control of their classroom environment. For example, perhaps higher achieving children need ongoing access to resources so that they will not get bored? What is it about perceptions of higher achievement that allows this flexibility foe them compared to the lower achievers? Do higher achievers have permission to be bored because we see them as already having acquired the knowledge or skill? Conversely is it that lower achievers are not permitted to be bored, because they have not yet acquired the knowledge or skill? Is there a difference in the type of boredom that is experienced depending on ability status? For example, might it be natural to assume that higher achievers will be bored with mundane tasks, but lower achievers should not because they do not have the right to be bored with mundane things? Perhaps only able learners can be genuinely bored – or bored for good reason because they have demonstrated genuine interest at some stage? These questions would be interesting to consider in comparison with the findings on occupational boredom. For example, based on industrial research (Wild & Hill, 1969) workers who become bored with a task will abandon it and dispel the experience by leaving the field if free to do so, perhaps demonstrated in voluntary labour turnover related to boredom. Having compared the children's ESM findings with adult university students, it might also be useful to compare these with other samples. Overall it does seem that there is a hierarchical view that sees it as acceptable for one group of children to be bored, and allows them an opportunity to modify this, while another group is neither permitted to nor able to modify this.

My findings indicate that this "rule" should not be applied to only the "high achievers" or "capable" children. It could be applied to all children in the class – irrespective of their ability or achievement. From the present data, We have seen that given equal working conditions – feeling interested, curious and excited with access to the resources needed – any child can learn. Conversely we have seen that any child – irrespective of their perceived ability – can experience the Factor 1 emotions given the same negative antecedent variables.

Summary

In summary, this chapter has briefly compared the main themes emerging from the quantitative and qualitative results chapters. I have also briefly examined the consistencies and inconsistencies found, and have made some tentative generalizations. Finally I have presented brief data from three teachers. Comparing the interview data from Rod and Ned with the perceptions of these teachers has illuminated one of the more intriguing attributions – that encountering new material is predicted as not being interesting, but boring. It appears that the teachers may inadvertently be shaping this unhelpful expectation, through their good intentions in trying to empathise with their students. A further important illumination was the consistency among the three teachers interviewed, in their perception that only capable children may be given the teacher's permission to feel bored in school.

Discussion

It is beyond the scope of this work to report any more of these qualitative data. Their importance for my thesis is that they indicate how influential the teacher's attributions are when they are expressed to the children in the classroom context. This is consistent with how readily children interpret teachers' task allocations or assistance given to children (Graham & Barker, 1990) as sign that children who receive help have less ability. As also indicated by Dion's experience and confirmed by Greenspan (1997), self-perceptions created in the classroom are resistant to change. Anecdotally also, if parents tell a child she is doing well, yet the child "knows" from her classroom experience that she is not, the classroom perspective will prevail.

My interview findings above also demonstrate emotional intersubjectivity as identified by Denzin (1984) and Schutz and DeCuir (2002). This triangulation of both teachers' and children's attributions about boring curriculum content suggests that they have connected to each others' "emotionality such that one feels one's way into the feelings and intentional feeling states of the other" (Denzin, 1984, p. 130). There appears to have been a successful conditioning of both teachers' and children's expectations together about whether school can and should be interesting all the time- despite the children's and teachers' beliefs that interested is the most useful learning emotion.

As Teacher One so openly expressed, "a hang of a lot is on the teacher's attitude". It would therefore assist teachers as well as students and children if everyone could manage to find the compulsory curriculum interesting despite its compulsory nature. This is yet a further indicator of the importance of the emotional relationship (intersubjectivity) of both teachers and children in the ZPD.

As noted by Sutton and Conway (2001) earlier in this thesis, the students are the most frequent stimulus for teachers' frustration. It seems therefore that emotional intersubjectivity and its role in scaffolding joint attention (Smith, 1998) might be a good place to start if one were to address the re-appraisal (Lazarus, 1991) of compulsory curriculum being boring to seeing compulsory curriculum as something that cold be made more interesting. Preferably this would not be by just doing it quickly as this is perpetuating the performance goal orientation (Ames, 1992) and not assisting the interest and enjoyment level, as my findings have demonstrated. While it appears that both teachers and children would like to feel interested, it is almost seen as a luxury that we cannot afford, because we have things we have to do and they must be done, so let us get them over and done with. However, the literature findings and my findings with this present sample, suggest that interested is a luxury that we *can* afford, which everyone deserves and which might even be achievable, with a subtle change in approach.

The next chapter will address this further.

CHAPTER ELEVEN: DISCUSSION

This final chapter commences with a brief review of my main findings. I shall then examine the main themes emerging from these findings, through the lens of the socio-constructivist classroom and the theoretical perspectives of Lazarus (1991) and Oatley (1992). The analyses in this thesis have proceeded from the macro-level to the micro-level and back to the macro-level again.

The first macro-level reporting included the statistical analyses of the experience sampling method (ESM) data, using methods modelled on those of Zelenski and Larsen (2000), with particular attention to their correlational analyses. The statistical analyses conducted on the ESM data found that the structure of these children's emotions was similar to the structure of those of adult university students (Zelenski & Larsen, 2000; Scollon et al, 2005). For example, the state emotions of the children conformed to a discrete model of emotion, and their trait-like emotions conformed to a dimensional model of emotion. However, despite this similarity, the children reported lower rates of both positive and negative emotions overall compared to the university students (Zelenski & Larsen, 2000). Through extending the methods of Zelenski and Larsen (2000) with a confirmatory factor analysis, the most significant relationships between the children's emotions were obtained. Three significant emotion factors were obtained.

Factor 1 comprised a fully negative cluster, Factor 2 a fully positive cluster and Factor 3 consisted of happy. Statistically these three emotion factors seemed to be different experiences, consistent with a dimensional structure of these children's emotions over time. Factor 2 actually captured three of Lazarus's (1991) pre-emotions, consistent with his theory that interested, curious and excited are in a category of their own, and are separate from the emotion of happy. These three factors were then tested against the "usual suspects" of achievement, gender, prior knowledge and concept learning as measured by pre- and post-test, to see the trends for this sample. The most notable finding was that the children reporting the positive Factor 2 emotions during the non-mathematical activities in this study tended to be the high achievers in Maths, and within that group - girls more so than boys.

My series of qualitative analyses commenced with an overview of the contexts from which the ESM data were obtained. This was followed by my micro-analysis of Dion's choice of which task to undertake first, then subsequent analyses of decisions made by other target children, and finally to a more general qualitative analysis from the wider sample. These qualitative analyses

have led to a deeper understanding of the ways in which the various classroom contexts (Nuthall, 1999) have played a role in these children's reports of their classroom emotions. From these qualitative results, I have proposed a model of decision-making incorporating Nuthall's (1999) four contexts and Lazarus's (1991) adaptational encounter, with specific attention to the entwined functions of emotion, motivation and cognition (Snow et al, 1996). Several key relationships between emotions and children's learning task engagement were found.

First, the qualitative analyses of specific events found that when the target children in Studies 17 and 18 were experiencing the Factor 2 emotions of interested, curious and excited they were attending to and learning new material, or engaged in a meaningful activity. The important outcome from this attention in conjunction with the Factor 2 emotions was that the new material was learned, with this new learning persisting beyond the completion of the topic. This was counter to the statistical result of no significant relationship between concept learning and emotion factors with the aggregated data, consistent with Yair's (2000) and Pekrun et al's (2002a, 2002b) finding that aggregated methods eliminate any information about antecedents for specific emotion experiences.

Second, observation and interview data have demonstrated that irrespective of the children's gender and achievement, all the target children were in fact capable of experiencing some or all of the Factor 2 emotions during learning tasks, and I found events in which they all did so. These types of events were also consistent with the types of examples cited by the target children from the wider sample from Studies 13 to 18. For example, nineteen of the twenty children from the wider sample across these four classrooms reported that they would feel interested in some curriculum area. Comparing that finding to Dion's detailed qualitative data, I found that although Dion reported stressed on every ESM occasion, there were other occasions when he would have reported interested, and these related to curriculum content in Space Topic.

Rewa's experience qualitatively informed the statistical finding that girls overall tended to experience the Factor 2 emotions more so than boys did. Rewa also qualitatively informed the finding that Factor 3 (Happy) correlated with Factor 2 (interested, curious and excited). Rewa was "usually happy", which may have predisposed her to feeling interested, curious and excited. Her reports of happy also preceded her negotiating her change of topic and working with Elle, perhaps also demonstrating happy's predisposing attitude for problem solving (Isen et al, 1987). Also, in contrast to Dion's experience of not accessing the book he needed on Day 7, Rewa was able to

access not only a wide range of relevant books, but also an interesting and unique Aztec calendar. Once again this was through another girl of similar achievement level, who was willing to share her unique resource from home. Similarly when Dion was reading the cool facts book, he learned the material in an enjoyable way. However for Dion, there seemed to be only one appealing resource, which he also kept at his desk – which was actually the same strategy as Lois employed on Day 7.

My detailed analysis of Lois's experience has provided some insights into how she - as a high achieving girl in maths - has managed her environment. Recall that the high achieving girls in maths were most likely to report the Factor 2 emotions of interested, curous and excited. In addition to securing the most useful book and other strategies already analysed in detail, Lois was selective in the way that she interacted and shared information. Lois mainly provided detailed information (from the classroom resource) to other high achieving girls. Reciprocated social skills were also evident in the ways that Kitty and Kellie interacted with Lois to find out what they needed. In contrast, Rhys (high achiever) shared his own knowledge with Dion (lower achiever) who was ignored by Lois unless it suited her. Thus the high achieving girls appeared to be facilitating their equivalent peers. This is consistent with the children's general preferences as reported during interview to not work with lower achievers such as Abby. This social selection may be a factor in why the high achieving girls were enjoying the activities more.

Third, the ESM data show that due to the higher frequencies of children such as Dion or Lois experiencing either Factor 1 or 2 emotions, there was a higher probability that ESM sampling would catch them feeling their predominant or usual emotions. What I have shown therefore is that these ESM reports are context specific in relation to the specific skills and learning history of the child. This finding triangulates with the comparison between the within and between correlations where across the full sample individual children demonstrated some consistencies. Although these consistencies may be trait-like they reflect the repeated effects of the environment rather than a persistent unchanging personality trait.

As argued throughout my thesis, rather than being personality traits, these apparent trait results actually demonstrated the persistence of certain environmental variables which in turn were related to certain predictable emotions being experienced. In other words, depending on the individual child, repetition of certain stimuli tended to be associated with repetition of similar emotions related to the necessary adaptational encounters each time. The problem with these

learned biases is that the cumulative effect of negative emotions, with the associated avoidance of any work that might predict these emotions, has caused a cumulative effect. For example, by 9 years of age Dion has a well-established strategy of avoiding any opportunity to practice the skills he needs – and for good reason. Unfortunately this has likely contributed to his lower achievement of any tasks requiring better than average comprehension skills and writing skills. By this stage therefore, Dion's definition of smart as "fast", with slow equating to not smart is actually accurate. However, Dion's decision-making processes have shown that his slowness actually reflects his avoidance of work that predicts difficulties and having to try, and the associated negative emotions. As argued earlier, Dion needs to learn better strategies to prevent him being daunted by such obstacles in the future. In terms of Lazarus's (1991) adaptational encounter, Dion needs to learn different ways of cognitively appraising these sorts of situation so that he responds with positive emotions towards goal completion, rather than responding negatively to the appraisal that it's "too hard and I won't finish". To achieve this Dion would need to learn new appraisal processes and experience successful outcomes as a result.

Fourth, within the classroom contexts I have examined the various environmental variables and shown that emotion may be an independent (antecedent) or dependent (consequential) variable in any adaptational encounter during classroom tasks. The explanations from the wider sample also suggest that emotion may be a consequence of certain types of events, such as feeling angry when someone else "kept copying my work." In contrast, feeling interested in an aspect of a topic seemed to be an antecedent in that before starting a specific topic something about it anticipates interest. But even this anticipation implies it is a consequence or response to some aspect of the total stimulus, even if a child knows nothing about it yet.

Finally, any of the target children (also irrespective of achievement and gender) was capable of experiencing either the negative Factor 1 emotions given the appropriate antecedent variables capable of eliciting negative emotions, or the positive Factor 2 emotions, also in conjunction with feeling happy or not. For example, Lois who had consistently reported Factor 2 emotions actually also experienced Factor 1 emotion of annoyed at other times during activities.

So how was it that positive emotions and successful learning were not being reported by every child on every occasion in these cheerful, busy classrooms with a pleasant classroom climate and with teachers who were motivated to be empowering children as learners?

As noted at the commencement of my thesis, these classrooms were under the direction of highly motivated creative teachers, who generally espoused a socio-constructivist philosophy. For example, Teacher 17 had a system where the children set their own timetables, and goals. She explained during her interview that "I think children are not given credit for being able to provide their own motivation and set their own goals. So I actually try to tell the children as much as I can what I'm going to assess and what they need to do". Teacher 18's children also had set personal goals, with many of them opting to become faster readers as part of her focus on teaching research skills over the year. Teacher 18 also explained that she had ensured there were enough resources for the class, "I had a look beforehand and made sure that the books related to the topics. So you're setting them up to succeed anyway, rather than setting them up (to fail by not having the resources)".

Three main themes have emerged from my research. First the classroom is shaping children's academic emotions. Second, constructivist teaching is difficult to implement, and third, we need to pay attention to children's emotions because they are related to learning. Finally my thesis has demonstrated one possible way of identifying children's emotions as a diagnostic towards intervention for learning to be facilitated.

Children's Emotions are being conditioned in the Classroom Context

It is not news that emotional responses are being conditioned all the time (Le Doux, 1998; Greeno et al, 1996; Goleman, 1995). My findings demonstrate that in the classroom context this conditioning might occur through within- person and/or environmental variables. Within-child variables include the child's personal sociohistory (Greeno et al, 1996) in relation to their previous classroom experience (Snow, Corno & Jackson, 1996), and their personal skills and knowledge system (Nuthall, 2000). Environmental variables include Nuthall's (2000) classroom contexts of the instructional evaluation system, the social interaction system and the physical context. The location or source of the relevant environmental antecedents for the individual emotions may be from within any or all of these contexts depending on the individual child. Through both the aggregated data and in-depth qualitative analyses of the contexts and events surrounding these data, my results have indicated that each emotion report from the target children accurately reflected the antecedent or consequential events correlating with the specific emotions reported. These analyses have confirmed the dynamic role of emotion as either dependent or independent variable, and that this role might change at any moment. Without the

qualitative analyses, these details of the momentary or state adaptational encounters would have been lost (Lazarus, 1991).

The emotion data were collected over time and across contexts so that any consistencies or inconsistencies of emotions reported have been compared with the contexts in which they have occurred. This has facilitated analysis of individual target children's learned "biases of emotional responding" (Jenkins & Oatley, 1998, p. 51) in different sorts of adaptational encounters. Consistent with the argument of Lazarus (1991) that aggregated data do not reflect personality traits, the quantitative and qualitative data have confirmed the repetitious nature of the events surrounding repeated reports of the same emotion by the target children over time. My proposed model of decision-making suggests how the different classroom contexts provided a range of variables that based on their individual sociohistory (Schutz & DeCuir, 2002), the children's emotions were differently elicited. Nuthall's (1999) four contexts helped locate the specific context/s of these environmental variables.

As an important practical example, detailed analysis of the physical context in Study 17 has indicated just how much of the actual physical layout of the classroom can be a source of negative or positive emotions. For example, the physical location of any child's desk will determine whether the person next to her provides irritations or support on a daily basis and whether she is able to sit comfortably and have the resources she needs and her own safe space. If negative emotions are persistently elicited due to even just the physical location throughout a full unit of learning or a full year of study, this will be a major source of emotional conditioning. Both Lois and Dion became annoyed through interruptions related to the computer close by. Apart from the noise from the computer itself, a number of social annoyances were afforded when children were hanging round the computer or even just looking around at it. While Dion was aware of his distraction, he could not "help it" and it still made him angry. Even Joseph did not always like the way that other children could wander round the room when it was not convenient for him. There were many other similar examples, with Abby's experience on Day 7 being the extreme. The more frequently that negative emotions are experienced in relation to the classroom itself the more likely that the classroom itself will become a conditioned stimulus for these negative emotions.

Access to resources afforded by the physical context, such as books containing the necessary information is a fundamental right in the learning process. Identifying information needs and

which resources might provide this information was an important first step in accessing resources. We saw that Lois and Abby had located their resources at the commencement of Day 7, while Dion only located his required resource later, by which time Selma was using it. To obtain or retain their resource, children also required negotiation skills, which might have been a tall order for children who were less respected in the classroom community. For example Lois did not share, yet her book was safe on her desk. Dion could not negotiate with Selma, yet he also kept hold of the "cool facts" book for himself. Abby - having no rights - was bullied out of the book she had accessed herself on Day 7. Later in Abby's interview, her perception was that she had let Brock take the book because he needed it more than she did, which was not true. Not being able to obtain or retain their resources was a source of negative emotions at the time for Dion and Abby respectively. Once again, repeated events such as these are likely to condition negative emotions with accessing resources. We saw how Dion avoided these negative emotions by doing something else on Day 7 after not obtaining the book, but he was feeling stressed, which made it difficult for him to get story ideas flowing. In contrast, Lois's repeated reports of Factor 2 emotions coincided with the repeated events where she had ongoing access to her books, in order to do her favourite activity of copying new facts.

As demonstrated with Dion's experience, the stress associated with not being able to get his work done, can totally disempower and disconnect the learning process consistent with an emotional highjack (Goleman, 1995). It might not take many associations between stress and trying for Dion to have stress conditioned with any situation requiring effort, because strong negative emotions are the signal to avoid danger. Undoing this conditioning would then require some sort of cognitive-emotional-behavioural therapy, whereby repeated experiences of having to try would be designed to result in success, thus classically conditioning positive emotions and optimism with the cognitive appraisal that effort is required, and he is going to have to "try". Similar to Seligman's Béarnaise Effect (Seligman & Hager, 1972), such conditioning is powerful and takes some undoing.

Seligman's (1972) story was that having had sauce béarnaise with steak one evening, he then became ill with the flu, which was totally co-incidental. When he next came to have sauce béarnaise, he disliked the taste and could not eat it. Even though he was a psychologist the unconditioned stimulus of béarnaise sauce became a strongly conditioned stimulus for feeling ill - from one event of association. Conditioned food aversions are important as they are protecting life, so that a person does not eat the same food again that made them ill last time.

Emotional safety is equally important. For example, in the stress response for fight versus flight, one conditioning event can be equally powerful with the fundamental goal being to preserve life. However, inappropriately conditioning stress to the school context has major consequences such as eventual truancy and dropping out of school. As Dion's story demonstrated, his stress avoidance strategies were well established and did not appear to involve perseverance through his difficulties.

Therefore as also argued by Boekaerts (1993) we need to take children's emotions in school seriously, especially their negative emotions. My findings also suggest that the children and the teachers are experiencing emotional intersubjectivity (Denzin, 1984), which could be used a means to strengthen the conditioning of positive emotions in the classroom context.

Emotional Conditioning – Gender Differences

Reliable gender differences in emotion experience were found statistically. Previous findings on gender differences in classroom emotions are variously relevant to my research. For example in their study of six to seven year old children West, Hailes and Sammons (1997) found that girls were more positive about school and specific subject domains such as handwriting, and reading to adults than boys were. My findings are consistent with these, perhaps confirming that during the few years between being a new entrant and a pre-adolescent in school, girls continue to generally feel more positive than boys do during school. Comparing the domain of handwriting, amongst the high achieving boys and girls (Ned, Rod, Lois, Joseph), more hand-written work was achieved by Lois. Amongst the mid-achieving children, Libby and Rewa produced more written work than Dion, as also did Abby also despite her lower achievement. The boys preferred different modes of showing their knowledge. However, rather than handwriting per se being preferable, it was accessing the material to write from that was the first problem. Being more practised in getting the material also meant that Lois was more practised in writing, because she then had something to write. In contrast, Dion did not know what to write so only wrote minimal amounts, thus had fewer practices at writing.

The detailed qualitative analyses of the higher rate of positive emotions reported by the girls in the present sample suggest that these might be due to the girls managing their individual environments better than the boys did. For example in addition to Lois's well-documented obtaining of the one good text reference, the other target girls arranged their environments

effectively for their own purposes. Libby worked in with her friends against the teacher's directive at that time, and Rewa set herself up with Elle who also had an excellent unique resource (the Aztec calendar with Spanish words on it). Even Abby exercised some control by changing her timetable or the time on her clock when it suited. In comparison, Joseph was the only target boy who managed to create the environment he wanted. He worked with friends to spicen up his working environment. Even though Rod and Ned were theoretically working with others, their situations were not the most satisfactory, and we have well-documented evidence of Dion's less than satisfactory environment. During these two studies, the children had choice of whom to work with. Not one girl chose to work with boys and vice versa. Comparing Study 18 to Study 16 (earlier in the same classroom), which had mixed gender groups set up by the teacher, there was more tension in Study 16 when the groups were mixed. Similarly in Study 17, on Day 9 the teacher set up mixed gender groups, some of which elicited more negative emotions from specific children (for example, Kitty) than on any of the previous samplings. It appears that the girls may have better-developed social skills than the boys in this classroom. This may be a significant issue for further research.

The present findings might also be consistent with previous findings on gender differences in the ways that children relate to their teachers. For example, children younger than those in the present sample reported more positive relationships with their teacher which in turn related to higher achievement for girls over boys (Valeski & Stipek, 2001). As part of managing their individual environments the target children in the present sample also managed their interactions with the teacher. For example, Lois as the highest achieving girl obviously felt confident in her relationship with the teacher to report the behaviours of other children that were bothering her, whereas Joseph did not use the teacher to deal with Abby – he told her off himself. In contrast, Dion and Abby did not access the teacher when they should have, avoiding any overtures made by the teacher to check up on how they were going. When Rewa was receiving repeated attention from the teacher on Day 7, she basically followed the teacher's lead, but when she decided to change her topic she did so herself and negotiated with Elle. She also chose her Aztec mask on the basis of the teacher's advice to someone else. Libby kept her own counsel with her friends, but they drew the teacher in to show her their sacrificing poem. They were reinforced with positive attention and praise from the teacher and also from the class. Consistent with this finding, Altermatt and Pomerantz (2003) found that eleven year old year old girls like to please adults – including their teachers - more so than boys, increasing their vulnerability to adult's disappointment. However, when disappointed in classroom situations, girls mask their own

disappointment more than boys do (Cole, 1996). Lois demonstrated a similar masking of her emotions. Recall that when the teacher did not agree to Lois's request to reduce the number of tasks she had to complete, despite Lois's complaints to Kitty that it was unfair, she accepted the teacher's argument and then told the teacher that she was starting another task. Through these and other fine-grained analyses, my qualitative findings inform the various previous gender differences findings with examples of these might occur in specific classroom contexts for individual children.

My suggestion above about emotional intersubjectivity (Denzin, 1984) being evident in the classroom, raises the question as to whether this might also be relevant to the gender difference finding. Is it easier for emotional intersubjectivity to occur between the girls and female teachers? This would be an interesting research question. It seems that emotional intersubjectivity occurs whether specific attention is paid to it or not. Intersubjectivity is necessary for effective scaffolding within the ZPD (Smith, 1998). Perhaps it would be useful to explore whether higher frequencies of positive emotions reported by girls in the present sample and cited in the literature above might be related to emotional intersubjectivity between girls and their female teachers.

My findings were obtained during activities in the social studies and science domains, so it was unexpected to find that the girls who were reporting positive emotions most frequently were those with documented high achievement in maths. So that in addition to the general gender difference found, a more specific within- and between-gender difference was evident on the basis of higher maths achievement. These findings might be useful to consider in relation to previous research on gender differences in maths achievement. For example, when specifically looking at gender differences in the maths domain, previous research has found that negative emotions were not only prevalent overall, but that girls reported more negative emotions than boys particularly during maths seatwork(Prawat & Anderson, 1994). In the present sample, the girls might have reported positive emotions more frequently when engaged in less taxing domains. This might provide a domain-related clue as to why the high achieving maths girls were the most positive during the present tasks. The lack of pressure to be making correct calculations would be more relaxing, and once again as long as you had the books, copying the facts down would be much easier than maths. Having said that however, the girls in our sample from Study 18 did report more anxiety than the boys did about their presentations. This is consistent with previous findings that girls are more susceptible to negative feedback comapered to boys (Prawat & Anderson, 1994).

Another possible consideration is that the achievement differences might reflect the greater organisational skills of children who are better at maths. Gardner's (1999) logical-mathematical intelligence offers the idea that sorting and logical sequencing are embodied in this intelligence – which all learners are capable of achieving, but which has been strengthened in some children due to repeated successful experiences and practice. Therefore in tasks or domains other than maths, these children may be better at planning and seeing their way through the series of tasks they had to complete. To the extent that the children in Study 17 had a series of tasks to do and count off as being done, this was a mathematical process – but with content about space.

Alternatively were these children's results similar to adult students (Zelenski & Larsen, 2000) because they were actually capable of psychological self-awareness, as the psychology adult students would be? This might be relevant, as this was the attitude of the children in the present sample in that they were willingly collaborating with the research team engaged in psychological research about learning. The results might be completely different with a different sample or school.

Finally in consideration of the evidence for emotional conditioning in the classroom, we need only go back to Libby's interview excerpt at the beginning of my thesis. Consistent with the previous ESM findings (Csikszentmihalyi & Hunter, 2003; Larsen & Richards, 1998), Libby appears to be commencing training for the weekly fluctuations in emotions demonstrated in older subjects. The least positive emotions were being experienced during school time compared to any other times or days of the week – "roll on the weekend!"

Difficulties in Teaching from a Socio-Constructivist Perspective

The teacher is in the unenviable yet pivotal role of having to facilitate the learning outcomes of a whole class of individual children through mediating the curriculum. Issues related to curriculum are beyond the scope of this work, but it must be acknowledged that curriculum delivery is influenced by school and government policies.

However from the minimal research on teachers' emotions, it is still worthwhile focusing on the individual events as occurring within the individual classroom, because this is where teachers live their teaching lives. Teaching is emotional work (Hargreaves, 1998), as also is interacting with the children in one's classroom. For example, Sutton and Conway (2001) found that the most

common emotions experienced by middle-school teachers in Ohio (U.S.A) were frustration and anger, with their students being the main elicitors of these emotions. Parents, fellow teachers and administrators were less likely to be emotional "triggers" (p.14). Therefore understanding the emotions of children should facilitate the relationships between teachers and children, and ultimately the children's learning. Also wouldn't it be nice if everyone – including teachers, could really enjoy their school day?

Previous research has identified the many challenges for constructivist pedagogy. These include the need for a paradigm shift on the part of teachers and administrators (Saphier & Gower, 1997, more specific identification of children's levels within their individual ZPD (Nuthall, 1999; Palincsar, 1998; Shayer, 2003), and letting go of the notion of apparent control as found in traditional classrooms (Windschitl, 1999). Much has been made of the argument that for the constructivist approach to be effective it cannot be an isolated event or token gesture (Windschitl, 1999), although Lapadat (2000) has argued that the mechanistic or transmission model can be extended through applying the constructivist perspective. Interview data from the teachers in the present study are consistent with Lapadat's (2000) evaluation. The present teachers have applied the constructivist perspective to the ways that they intended the tasks to work. Tasks and activities are at the "core" (Hickey, 1997, p. 176) of socio-constructivist methods. Therefore while we might argue that it is not possible to teach within the constructivist perspective unless the educational environment totally supports it, because the core is found in the classroom, this is a good place to start. Teachers do not need to wait for the system to change to organise tasks to engage their students.

In support of approaching constructivism from the task level, Yair (2000) has also argued strongly "one need not wait for whole-school reform" (p. 206), nor even re-educate students, for effective tasks towards effective learning to be implemented. For example, based on his analyses of the structural antecedents of children's learning experiences, Yair (2000) suggests that all that is needed is to make instruction more relevant, allow more choice and make greater demands on students' skills. These recommendations are supported by my findings, in that when the children were requested to find new and interesting material, they did so and they learned it. When it came to making choices, choosing new information on the basis of interest resulted in successful learning of the selected information for all the target children. However, when choice would determine how successfully a task might be actually completed or presented to the class, the evaluation procedure undermined the interest factor and children chose based on expediency. As

the qualitative data have demonstrated, this effect was strongly indicative of a performance goal orientation (Ames, 1992), which would seem to be at odds with the original intentions of the teachers. How did this happen? And also what role did the classroom rituals play in sustaining ability differences in these two classrooms?

From the very beginning of Study 17, the children's perceptions of their own abilities and those of their peers were confirmed in the public domain. My interview findings confirm that when other children hear a child's personal low achievement information from or mistakes being corrected by the teacher, this predicts embarrassment and shame. This might explain why Abby and Dion did not seek help when they needed it as it might confirm their lower abilities to the rest of the class (Graham & Barker, 1990). Ironically, the main help Dion required was the resource and this was no different to Lois who asked the teacher at the beginning of the session for the book she needed. Unfortunately, it may be too late to protect any child's privacy in the classroom by Year 5. Anecdotal evidence is that children's achievement in any subject domain is public property in the classroom. Despite the PAT scores being confidential the children have already intuitively created their own mathematical bell curve and located themselves and their peers on that. For example, children queue up at the teacher's desk to get their work corrected so that they all see who has the most spelling or maths correct.

One of the most significant findings both quantitiatively and qualitatively, is that achievement data have had an impact on the classroom lives of the target children in the present sample. It seems that despite Nuthall and Alton-Lee's (1997) finding that irrespective of ability labels, all children can learn provided they have enough interactions with the information or concepts, the ability labels applied to the target children in Study 17 have had an impact on their outcomes. The examples I have presented show that even when the teacher intended treating her students as individuals, the reality is that her public disclosure of differing expectations for her students based on their ability labels has shaped the target children's classrom experience, rather than the other way round. For example, the PAT tests were originally intended to identify areas for strength building and teaching to, consistent with identifying the zone of proximal development (ZPD) (Vygotsky, 1981) for each child. But, as soon as any test results are used for sorting children into groups, they automatically become categorised according to ability. Even if the teacher does not state this, the children do. Although this was not the intention of its authors (Reid & Elley, 1991), it is the practical outcome. From a practical perspective once grouped together the group is treated as though it has a group ZPD (Shayer, 2003), because children are

grouped according to their PAT scores. So that while it all seems to be socio-constructivist, as previous researchers have also found (Windchitl, 1999; Lapadat, 2000) it is very difficult to implement socio-constructivist teaching in discrete topic areas without the philosophy fully underpinning the school-wide philosophy of teaching and learning. In conjunction with the incidental differences in how higher achieving children relate to their teachers compared to lower achieving children, the classroom perceptions of ability differences are strengthened on a daily basis.

For example, in addtion to the teachers' interview data that their "higher ability" children have been told they can tell them when they are bored, the teachers have indicated in interview a number of other ways that "more able" children are facilitated differently to "lesser able" children. According to one of the teachers interviewed, "evaluation's a really important one too especially for those more able children, because it takes them a wee bit further". As another example, Teacher 18's class was known as the high ability class, as she explained in response to a question about whether she trained them to work in groups. This teacher explained, "Not a huge amount. Because they're able kids and you don't really need to sit down... they have fairly well established co-operative skills". Observation and interview data from Study 18 did not support this assumption made by the teacher. This example is included here to demonstrate the range of assumptions that can be made when we function under a belief that some children are more able than others. My findings in conjunction with Nuthall's (1999; 2002) reports support the notion of ability being shaped by the classroom, rather than the other way round.

Another problem identified by Windschitl (1999) and also demonstrated by Lois's attributions is that higher achieving children may not actually want to help their peers. Lois certainly did not treat her peers as equal, and it is unlikely that the teacher realised the extent to which Lois actually controlled the environment to suit her own needs. However, Lois did not hesitate to enlist Kitty's moral support about her unfair workload. Similarly, Abby was not equal to anyone in the classroom. The socio-constructivist approach would ideally see the children respecting each other as equals in the teaching/learning process and would perhaps bring them into the consultative process with each other and with the teacher earlier on, in the spirit of a community of learners (Palincsar, 1998; Rogoff, 1990).

Joseph and Lois were prepared to initiate conversation with the teacher. But when these higher achieving children initiated such conversations, they were not help seeking, and in Lois's case

they were frequently chastising other children. These differences in how children relate to the teacher do not reflect a socio-constructivist perspective. Similar to the teachers' data as to who may report boredom to the teacher, it suggests that higher achievers have a different and more equal relationship with the teacher compared to lower achievers. However the teachers themselves do not realise this is what is happening. For example, Teacher 17 spoke several times about the importance of knowing your individual children's (students') ZPD. For example, she said, "You have to know your children really well.....You've got to take the time out to know what makes them go..... Look at the child and what support you have to put in".

The teachers did not realise that they had set up a performance goal orientation (Ames, 1992). For example, by reading out the task allocation for each child, Teacher 17 did not realise it but she was also confirming the main achievement criteria for task engagement. This was that the set number of tasks had to be achieved. This teacher noted in interview that the children were "very accepting" of their individual allocations, although as we saw later, Lois was not very accepting by Day 7. As the data have demonstrated, the main priorities were to get the minimum number of tasks done, and to make sure that if you were a lower achiever, you were equal to the higher achievers in terms of how easy you found it. Abby and Dion were each praised for finishing their tasks, without the teacher actually reviewing the content of their work. Jospeh was the only target child to sign his contract.

From the qualitative analyses, I have described the various antecedents to the children's emotions arising from the various classroom contexts. The children were concerned with getting tasks finished. I have argued that the need to get work finished meant that the children's emotions were continually being conditioned in relation to the pressure to get their work done. This was demonstrated in the overall performance goal orientation (Ames, 1992) across the target children. There were also the associated concerns such as being right or wrong. Other evidence included their fear of embarrassment about being wrong or corrected in front of the class, drawing attention to others' mistakes and in Dion's case, making sure that other children knew he had completed something and that it had been easy.

In general, due to the need for facts to be recorded, the performance goal orientation (Ames, 1992) and the lack of enough resources to share, access to books and achievement of the set tasks in Study 17 was inadvertently set up competitively. The competition prize was having access to the facts contained within the resources, which the children then had to transfer to their books as

evidence of learning. Teachers sometimes experience contradictions when it comes to the amount of written work children manage to record in their books. For example the teacher said that she tells parents not worry how much is written in their books, but she found that her only means of assessing what work had been done for Space Topic was to look at the children's books. As the teacher explained:

> When you look at the quality of the work in their books, some of them have worked really well and you know that they have thought about what they're doing. And they've taken that on board. And then you've got that little group in the class who think oh I'm going to get all this done, it doesn't matter how I get it done and really, what does the answer matter (Teacher, Study 17).

As also expressed by other teachers, there does seem to be a number of children such as "that little group" or "some" who do not manage to meet the requirements. This teacher above has indicated that the children may not have "taken that on board". This might reflect the different perspectives of this teacher and the children in terms of goal orientation (Ames, 1992). The teacher's comments above suggest that she had more goals in mind than merely getting the task done, but this was not stated. However, as my analyses have shown, the four target children had interpreted the main goal of the tasks as getting them done. The teacher has also indicated that she had wanted some sort of answer, and the work done in some sort of way. The teacher had written her questions modelled on Bloom's taxonomy (1952). It is beyond the scope of this work to analyse whether the questions were written in such a way as to achieve the six cognitive strategies of Analysis, Synthesis and so on. But it was noteworthy that the four target children were able to write their answers to Comprehension Task 3 about why Earth was different to other planets from the facts that they already had in mind at their disposal.

None of the target children in Study 17 actually knew what any of the Blooms (1952) categories meant. Apart from Lois, who said that she had attempted unsuccessfully to look them up in the dictionary, none of these children were curious about what the words meant, although transcript evidence presented earlier was that Dion did say to himself, "what's evaluation?" when the teacher called out the word. Their responses to my interview question about whether it made any difference to how they worked on the tasks, was that it did not. This lack of attention to the categories confirmed their focus on getting on with the tasks. When I discussed this issue with Fullbright Distinguished Professor Tom Shuell during his visit to the Project on Learning (Nuthall, 1999), he asked me whether it would be necessary for them to know these definitions.

My answer now would be that if the tasks had been created appropriately for the categories, perhaps not. However, their understanding of Bloom's taxonomy (1952) and rationale might have assisted their cognitive processing. It might have been a good opportunity for a socio-constructivist type of activity, rather than be merely completing a series of tasks.

Another teacher has said she thinks deadlines "work well". She later confirmed the performance goal (Ames, 1992) effect that "giving them the deadline, saying you will have three to five minutes on this day to present your work, suddenly gives them the drive to get things done...It's like the end goal...even as adults we need the end goal". This teacher also acknowledged that "as the deadline came they thought gee, better get something done.. we'll just do it straightaway". Commonsense tells us that certain tasks and activities must be time-bound and it is helpful to know that you are not going to be doing the same activity ad infinitum. Where it becomes a problem is when the task depends on access to resources that must be shared, or when information is actually not available. Further problems arise when some children such as Dion and Abby might have vocabulary or handwriting problems that slow them down. As we saw in the children's attributions (Chapter Six), more speed equates to being smarter.

As argued by Nuthall (2001) and confirmed by the present emotion data, just because the children look busy, it does not mean they are interested. Perhaps better diagnoses might help. For example, without invading the children's emotional privacy my findings suggest a role for an emotion diagnosis. For example, perhaps a teacher could take the risk of asking whether the children were interested, curious and excited (Factor 2), or whether they were bored or not. This diagnosis could only be risked however, in a genuine supportive type of learning community. The issue of teacher-student interaction would not be seen as negative in a socio-constructivist classroom context.

In setting activities, teachers need to monitor the children's progress. Often teachers say that they look around the room and notice that they are not needed. For example, one teacher said, "I was amazed you know, I looked around at one point and thought I don't even need to be in the room". Another teacher said the almost identical thing, "Sometimes I sit down and I say to the children, doesn't anyone need me? You know I'm sitting here, don't you need me? No, they say. Well, hasn't anyone got a problem, you know?" As my data have shown, children do need their teachers even when it does not appear so. Those who needed them most would certainly not say so in front of everyone else. Teachers are being persuaded by the apparent evidence of the busy

classroom, and Nuthall (2001) has found that children do not want anything more than superficial attention from the teacher. Under a socio-constructivist model, there should be ways to scaffold children without it being an indicator of a problem or lower ability.

Nuthall (1999) has found differences in the extent to which students created learning opportunities, or made use of the opportunities and resources available in the classroom. Students with higher achievement seemed to understand the purposes of the activities. Nuthall and Alton-Lee (1997) have attributed this in part to the shared cultural understandings between the students and their teachers. In terms of culture, Rewa and Dion were Maori, Lois was Korean and the remaining target children of Studies 17 and 18 were Caucasian (or Pakeha). Rewa reported that she was "usually happy" at school anyway, while Dion reported stressed on four of five occasions sampled. These two children were in different classrooms. Rewa worked with Elle throughout, while Dion worked alone apart from using Rhys as a resource. Dion may have experienced Factor 2 emotions more frequently had he worked with Rhys or other children more constructively. There were occasions found where Dion enjoyed learning new information when in a positive social context.

There may have been culturally derived reasons why Dion did not access the teacher, but this was not explored. For the purposes of my inquiry, we have seen that had Dion's needs been met he would not have been stressed and could have been scaffolded appropriately towards task engagement. As the data show, Dion was fully capable of learning when given clear instructions and the time and materials to engage. He also favoured the visual spatial mode of information presentation, making a point of "watching" the picture of the planets in their correct sequence, in order to learn them. This was evidence of his potential for mastery goal orientation (Ames, 1992).

One of the characteristics of socio-constructivism is the process of intersubjectivity, which Rogoff (1990) argues is actually "required" (p. 7) for appropriate scaffolding to occur. Within this interaction, joint attention (Smith, 1998) and emotional intersubjectivity (Denzin, 1984; Schutz & DeCuir, 2002) set the quality of the relationship between the expert and the student. Both parties need to be able to connect emotionally as well as cognitively and motivationally. So from the perspective of my findings, understanding each other's emotions would be an important component in effective individualised scaffolding. From the triangulation of the similarities between the teachers' and the children's perspectives on compulsory boring curriculum content, emotional intersubjectivity appeared to be occurring already. As Palincsar (1998) has also argued,

"an intersubjective attitude ... is a particular challenge in Western societies, in which individualistic traditions have prevailed" (p. 355). This challenge was well illustrated in Lois's individualistic approach to access to the classroom book "Outer Space".

My findings might contribute to the area of understanding emotional intersubjectivity through having shown that the specific emotions occurring within the adaptational encounter of any task, point to the individual scaffolding needed at that time within that context. For example, it is important to note that I did not have to psychoanalyse Dion in order to identify (and deal with if one had been in a position to) the causes of his stress. I have analysed his experience solely through the contextual observation and interview data. I have not had to probe his home life because the changing classroom context can change emotions simply by providing for his needs. For example, if I take an item back to the Warehouse, I might be feeling angry, but getting my money back will solve the problem. Certainly if I had such a high rate of returning goods that I had a history of disappointment and anger, I might get angry more quickly and I might look like I have an anger problem, but it would still be contextual and not a personality trait. If we take that sort of approach with identifying children's learning needs at the time we shall reduce the likelihood of conditioned negative emotions and learned negative biases (Jenkins & Oatley, 1998). We do not have to be scared about understanding emotion. With the appropriate training, teachers and children could be trained to indicate "yeah this is interesting", "no, this is not interesting (or) this is boring". Then they could respond in such a way as to say, "ok what would we need to do to make it interesting?"

One of the significant findings from Yair (2000) was that students need authentic tasks, and these in turn improved students' moods. His finding was that there were not enough tasks and activities that "spark the heart" (p. 192). His analysis also indicated that students' emotions fluctuate during the school day. My findings have extended these findings by identifying specific antecedents for specific children's emotions, as well as indicating that individual moments of positive emotion and learning can occur without having to change school policy. Changing the context and hence the antecedents can be done at classroom level. For example, my findings support Yair's (2000) hypothesis that "academic stimulation occurs in instructional units that are authentic, choice-driven, and demand skills" (p. 192), and that when this does not happen students are bored or depressed. Similar to his findings that the latter sorts of events are "overwhelmingly represented in students' daily school life", my findings were that only 35% of the emotion reports were "interested". Yair's (2000) metaphor of the heart is consistent with its role as the traditional

symbol for emotion (Averill & Nunley, 1992). In acknowledging this role for emotion sparking the heart should also spark motivation and cognition.

Some contradictions have been demonstrated. For example, children expect school to be boring some of the time. New learning might be expected to spark the heart, yet the children demonstrated an expectation that: (a) school could not possibly be interesting all the time and (b) that it had to be boring because you have to learn new facts. But by the way, if you make it interesting, they will be able to learn it better or more easily. Boekaerts (1993) also found that children have expectations that school will be stressful – consistent with the present finding that most of the children asked expected school to be boring (which was found to correlate highly with stress in Factor 1 for the present sample). My findings inform these further through confirming that emotion experience can certainly include anticipation, and that through teachers' attempting to empathise with the children's boredom, they may have in fact helped create the expectation.

The teachers themselves confirmed this in their interview responses and to the children in their attempts to empathise with the compulsory nature of some curriculum content. There was remarkable consistency between the interview data from both the teachers and the children. One teacher was very frank in stating that sometimes if the teacher is reluctant about a topic it will transmit to the children. This is consistent with the notion of emotional contagion (Jenkins & Oatley, 1998) and emotional intersubjectivity (Denzin, 1984; Schutz & DeCuir, 2002), once again confirming an emotional relationship between the teacher and her class. Other researchers have confirmed that the socio-constructivist perspective places high demands on teachers' knowledge domains and skills in being adaptable (Lapadat, 2000; Windschitl, 1999). In empathising with their class, rather than agreeing that this is boring and teaching the children to rush through tasks that they feel reluctant about, teachers might be better to ask the children "how can we make it interesting?" Inadvertently the teachers might be continuing to reinforce the boredom expectation as well as a performance goal orientation (Ames, 1992) when they encourage the children to get this finished so they can then get on with something interesting. An alternative approach might be to simply ask, "What would we need to do with this curriculum item to make it interesting?"

As my findings demonstrate, the teacher can make a difference to the children's emotional experience and hence their learning experiences at an individual level. For example, if the teacher had known the antecedents to and indicators of Dion's stress she may have been able to help.

However, apart from Dion telling me this and writing it on his mood slip, none of us knew the full extent of Dion's stress until his video-cued interview. Although the teacher had overheard him say this to me once, and on that occasion she said to another observer, "he worries me that boy", it was not dealt with at the time. It would have been difficult for the teacher to do so, because Dion had said this to me rather than her, and it was a new type of report from a child. Recall that these classrooms were cheerful and hospitable and general perusal of the room at any time would not have detected Dion's stress. Even with the optimum emotional intersubjectivity, children may not wish to report feeling stressed to their teacher. Future situations like this could be dealt with differently, if strategies were to be put into place.

For example, based on my findings that in the presence of interested or cool, fun, happee, Dion was not stressed, he could be asked whether he was feeling interested, "is this cool?" In the optimum situation he could reply honestly yes or no. In the event of no, steps could then be taken. For example, ensuring that enough resources were available in the first place would have pre-empted stress for Dion on Day 7. On those occasions when he did not know what to write, scaffolding in how to generate ideas – such as brainstorming or using visual mind maps might be useful methods to get his cognitive processes going. Finally we have also seen that when Teacher 17 gave clear instructions for watching the video, to find at least one new fact, the target children all achieved this. In addition, this task was followed up with several opportunities to engage with the new concept, with the effect that it was learned.

This finding supports those of Nuthall and Alton-Lee (1997) on the number of interactions required in order for new concepts to be learned. Nuthall (1999) had suggested that what is needed next is further understanding in how children develop interests and attitudes to learning. My findings have begun to answer this question by indicating that these interactions need to be accompanied by the Factor 2 emotions in order for the child to pay enough attention to engage, and to ensure that engagement is sought and repeated. This is consistent with the argument of Csikszentmihalyi and Hunter (2003) that people practise or repeat the things they can do well to re-experience the positive emotions associated with flow. Therefore, the more interest, curiosity and excitement that can become associated with learning, the more it will be sought. (How else do you explain anyone ever doing their PhD?)

Finally, my findings inform the socio-constructivist perspective for teachers through confirming that these children's emotions were as valid and important as adults' emotions, also indicating

that the elementary school classroom may be shaping the future adult emotions in these learning contexts. In the interests of fostering emotional intersubjectivity (Schutz & DeCuir, 2002) the present finding that children could attribute logical core relational themes for the usual emotions and for stressed, similar to those of adults, means that children and adult experts have the potential to connect emotionally. Ultimately there is a relationship between the teacher and each individual child. We have seen how the perceptions of ability and purposes of tasks have influenced the ways in which teachers and children interact, thus perpetuating these inequities. It does not have to a daunting prospect to remediate these, and it is certainly worth considering – even if for no other reason, than the role of emotion in fostering learning. This should make all of our lives happier and easier.

Emotions are Important because they are Related to Learning

My findings have demonstrated that the Factor 2 emotions of interested, curious and excited were present when successful learning occurred for all the target children in this sample. This successful learning has persisted through to the end of the unit and post-test interviews several weeks later. Further, this learning has persisted even through subsequent classroom events of attending to the learned material when reporting boredom or annoyed. Quantitatively through the simple frequencies we have seen that in Study 18, the target children who reported Factor 2 emotions more frequently learned the most new concepts, although this was not statistically significant in the aggregated statistical analyses. For Study 17, the level of prior knowledge based on the pre-tests of the target children gave less room for movement.

Less directly associated with successful learning, but certainly influencing *what* was learned, was that some target children chose topics or tasks based on their anticipation of experiencing Factor 2 emotions. Other target children chose tasks based on how well the tasks predicted the *absence* of Factor 1 emotions of boredom, stress or anger. The children's category of fun or enjoyment tended to combine the criteria of either incorporating Factor 2 emotions, or eliminating Factor 1 emotions, with being achievable without too much time required. This in turn would be associated with feeling happy, because the task could be finished. Fun also incorporated an optimal level of prior knowledge, which differed across the perceived ability or achievement status in Study 17. For example, if Lois felt she knew most of the material already she would not choose that task because it would be boring, whereas Abby and Dion did choose material they knew already because that meant they would be able to finish the task. Incorporated in that

assessment, would be Bandura's (1997) self-efficacy beliefs and theories from that domain of research, exploration of which is beyond the scope of my research question. My findings attribute the inferred performance classroom goal orientation (Ames, 1992) with driving this decision. In the absence of performance goals and in the presence of mastery goals (Ames, 1992), the results may well have been different.

Detailed analyses of the various target children's cognitive appraisals during the various adaptational encounters (Lazarus, 1991) in which their choices were made, demonstrated the individual differences in each child's unique decision-making process. Depending on the context (Nuthall, 1999), the business at hand (Lazarus, 1991), and their unique sociohistory (Schutz & DeCuir, 2002) within the classroom context, any component might be the main stimulus for eliciting the anticipated positive emotion outcome, or preventing the anticipated negative emotional outcome of the particular choice. My findings demonstrate that the quickest way in towards understanding this complex interplay between emotion, motivation and cognition was through asking the child how they felt about it.

With these quantitative and qualitative findings, my investigation has risen to the challenge of attempting to find that elusive relationship between specific learning and specific emotions. My findings have contributed further to our understanding of the role of emotion in learning, as well as raising further questions. Previous research has scaffolded this present opportunity to explore the complex dynamic of emotion and learning. For example, Pekrun et al. (1992, 1995, 2002a, 2002b) have been attending to emotions in the academic domain for the past decade or more, also identifying through their earlier thorough literature review, that the role of positive emotions in learning has been neglected. They have created the category of academic emotions acknowledging the unique and significant context that school is. In addition, to justify this category, Pekrun et al (1992) argue similarly to Lazarus (1991), that we only get emotional about what is important, and what could be more important than school where one's future life's path is charted?

Academic emotions have been linked to academic learning and achievement in general, also including students' emotions about their emotions (Pekrun et al, 2002a, 2002b). Pekrun et al. (2002) also identified the role of specific classroom or academic antecedents as far as timing of certain emotions such as test anxiety. For example, they were able to differentiate between the effects of trait anxiety across the duration of a course and state test anxiety at the time of a test.

Similarly Boekaerts (1993) has identified trait and state effects of anger with gender differences found as discussed earlier. To inform their quantitative results Perkrun et al (2002a, 2002b) analysed their students' extensive longitudinal diary data. Similar to Yair (2000), Pekrun et al (2002a, 2002b) also encourage us to change experiences by changing antecedents. Boekaerts (2002) has also been able to identify antecedents through her On-line Motivation Questionnaire (OMQ), a tool which other researchers (e.g. Ainley et al, 2002) have also used and modified for computer use.

My findings extend those of Pekrun et al (2002a, 2002b) and these other researchers in several ways. First I have been able to confirm the role of specific context variables on specific state emotions during specific learning events, by using the aggregated methods of Zelenski and Larsen (2002) and the in-depth qualitative analyses. Second the modified ESM methodology has been used to obtain on-line data within a classroom learning context that has been fully captured by the observation and video-recording methods of the Project on Learning (Nuthall, 2002). And third, I have obtained extensive in-depth interview data about the ESM events and the children's learning or not learning during those events. As Pekrun et al (2002a, 2002b) had also indicated, a combined idiopathic-nomothetic or multiple method (Schutz & DeCuir, 2002) approach is really the only way to capture such breadth of data.

More recent findings acknowledge that students' emotions change during learning activities (Do & Schallert, 2004; Nicholls et al, 2003; Laukenmann et al, 2003). For example, Laukenmann et al (2003) targeted specific phases of a unit in 8th Grade Physics, to find that anxiety seemed to appear closer to the time of testing compared to higher interest earlier in the unit of learning. My findings are consistent with theirs in that the Aztec research content was chosen on the basis of interest, while the mode of presentation was chosen on expediency. In the Space topic, while the tasks were chosen on the basis of interest, they also had to be quick and easy because of the number that had to be completed. Therefore the assessment processes in Laukenmann et al's (2003) study and also in the present study have contributed to the emotional responses of the respective samples at certain times during the respective units of learning. This has also been explained in terms of performance goal orientation (Ames, 1992), which has also been shown to be associated with anxiety both in Ames's (1992) specific classroom goal research and other emotion researchers such as Boekaerts (2002) and Altermatt and Pomerantz (2003).

Based on my findings and in comparison with those of Laukenmann et al (2003), the modified ESM procedure could be timed more specifically in a future study. Due to the robust evidence as to the reliability of samples in these on-line sampling procedures, targeted ESM using the simple mood slips might usefully obtain a series of emotion readings across the life of a unit of learning. My findings have extended those of Laukenmann et al (2003) by their simplicity. These could be extended further through modelling their more specifically targeted timing of sampling. This in essence was the rationale of Ainley et al (2002) who used the more complex OMQ (Boekaerts, 2002) specifically timed to capture and measure immediate interest in their older sample using computer technology.

My findings extend those of Ainley et al (2002) through offering a simpler yet reliable methodology, which has been able to capture moments of the Factor 2 emotions of interested, curious and excited occurring at the time of attending to new material. When these emotions were reported at the times of attending new material included in the pre and post-test, this material has been shown to have been learned.

This is another area where my findings have contributed to this body of literature. The observation and video-recorded data have enabled these moments to be specifically identified to triangulate the reported emotion with the environmental variables. The new material being attended to has been recorded and the tests or interview questions have been able to elicit from the children what specifically they *now* know about that material that they did not know *before* that moment of attending while feeling interested, curious or excited. Therefore I can confidently argue that these emotions were positively related to learning. This finding was not consistent with the aggregated data, when the overall pre- and post-test scores were tested against the emotion factors. However this finding was also consistent with previous research (Nicholls et al, 2003), with the present arguments as to why this inconsistency occurred also being the same. It either reflects the overall test being not related to the learning events or the loss of detail when data is aggregated in this way, both of which I also found. However, incorporating both quantitative and qualitative methodologies has ensured that I have not lost the important finding of the role of interested, curious and excited in relation to specific learning achieved.

The overall implication is that tests are not the best way to measure learning, due to a number of issues, such as differences in reading and writing skills, and emotional responses such as anxiety or nervousness. Some of the target children said that they were nervous about the tests. However,

providing the opportunity for the children to answer the test questions verbally also helped. In the present study, the tests did not sample the full range of concepts possibly learned. However, by going to the individual tests and looking for specific items learned by each target child, I was able to find that there were moments with Factor 2 emotions associated with active engagement and learning.

A further important issue is that as educators we need to re-evaluate how we measure learning in general. For example, going from the test scores, we could be lulled into thinking that Abby had been successful – which she was, but only because she had the least prior knowledge. Also based on the qualitative findings on Abby's experience, we should never be satisfied or accept that this has to be her "lot" in school. Her experience would be the antithesis of socio-constructivism.

Prior knowledge was relevant to the emotions reported by the children, consistent with previous research (Nuthall, 1999). Recall that with the aggregated statistical results, significant negative relationships were found for pre-test and post-test scores with Factor 1, the negative emotion blend of angry, nervous, stressed, annoyed, bored and embarrassed. The higher the individual pre-test score the less likely that child would be to report negative emotions during the classroom activities sampled. Qualitative data showed that knowing facts was highly valued in the class, so it might be a logical finding that already knowing information reduced negative emotions. For example, for the Comprehension 3 task, each target child used their existing knowledge and did not need to look up information, so that meant that task could be ticked off the list, reducing the anxiety associated with performance goals (Ames, 1992).

Previous research has found several positive effects of feeling happy. Inducing a state of happiness has improved the cognitive test performance of 6 – 7 year olds (Rader & Hughes, 2005), facilitated mood congruent recall of positive events (Mayer, McCormick and Strong, 1995) and fostered creative thinking (Isen, Daubman & Nowicki, 1987). Feeling happy predisposes people to find tasks interesting because their mood affects their evaluation of the tasks and they can also perform them more creatively (Hirt, Melton, McDonald & Harackiewicz, 1996). My findings are consistent with and extend these findings through both the quantitative and qualitative evidence. Through the statistical analyses, the specific positive affect components that are significant have been isolated more specifically. For example, the statistical finding that happy correlated with Factor 2 emotions of interested, curious and excited suggests that happy might predispose Factor 2. Qualitatively there was support for this hypothesis also, in Rewa's

persistent state of happy being present prior to her Factor 2 emotions at certain times. In other words against a backdrop of feeling happy as was her usual state, Rewa was in readiness for being interested, plus she continued to report happy alongside interested. As discussed in the statistics chapter, as educators we need to increase the rate of children's happiness in order to predispose their interest and prevent their stress.

Looking at the cognitive component of the children's learning experiences, there was no real sociocognitive conflict occurring in these two classrooms. Where there was difference of opinion, it caused stress and it appeared that children did not want to be wrong. Consistent with the transmission model, knowledge was the currency and it had to be correct, also perpetuating the mistake myth (Herenkohl et al, 1999). Consistent also with Eklind's (1974) assessment that people might avoid trying to assimilate new information that will not easily be accommodated, the target children in Study 17 appeared to do so, and Dion in particular. What my findings confirm is that children need to be acculturated to welcome cognitive conflict without stress and in a context of at least feeling happy. This should facilitate problem solving and promote the Factor 2 emotions. Similarly in training for group processes, sociocognitive conflict (Anderson et al, 2001,) can also be facilitated. For example, New Zealand teachers could be trained in the more recent peer facilitation models such as Brown's (1998) collaborative methods designed and researched in New Zealand. Within-child cognitive factors such as self-beliefs and thoughts will also impact emotions, as we saw in particular with Dion. For example, fear of not finishing or fear of failure based on previous negative experiences will create conditioned emotional responses such as avoiding new knowledge to avoid the stress of not understanding it, or it taking too long and not getting finished. The good news is that competency beliefs and expectations can be changed and surprises can result. For example, subsequent to Dion's few minutes of flow as he engaged and completed the Comprehension 3 task, he realised that he had changed his usual outcome of not finishing and surprised even himself, "I can't believe I've finished one of my things!" As a result of writing his four lines about why the earth is different to other planets, he was cool, happy and confident to share the news. That was all it took to change his experience. If this happened more often he would develop a more positive expectation and would gradually condition positive emotions to the new belief that he was capable of finishing tasks.

I have proposed a model of decision-making incorporating Nuthall's (1999) model of learning, together with Lazarus's (1991) adaptational encounter and Snow et al's (1996) three functions of the mind. The late Professor Emeritus Nuthall had read this material and Dion's story and wrote

to me shortly after 9.11 from Italy where he was staying at the time: "I have read your chapter with great interest... I like the range of ideas and the way you have worked on every aspect of what was happening for Dion" (email from educ067 to veronica.ot, Tuesday 9 October 2001). One of my original aims in my research proposal was the possibility of developing a model to include emotion in this way. When learning events were analysed at this micro-level, the role of emotion as antecedent or consequence in the dynamic interplay of emotion, motivation and cognition was identified. Apart from a brief summary of the motivation literature earlier in my thesis, minimal attention has been given to the broad area of motivation in this inquiry. This is not to minimise the motivation literature, but as acknowledged in the literature review, there is already strong evidence of its entwined role with cognition. However, my inquiry having commenced from the perspective of emotion, found the role of motivation with Ames's (1992) mastery versus performance goals being relevant to the children's responses to the teacher's expectations. Despite the teachers' perceptions that the children understood the academic goals of their tasks, the children have intuitively responded in ways consistent with Ames' (1992) findings.

Generally, performance goals seemed to prevail after initial interest in possibly mastering the new material. Lois may have been the exception having stated her long-term mastery goal of eventually being a surgeon and wanting to succeed in school because of that long-term goal. However, that long-term goal was not enough to sustain her through the series of tasks once she had decided it was unfair. Similarly, social goals (Wentzel, 1999) have been identified mainly in Joseph's situation in Study 17. Had more time been spent analysing the various social interactions of the other target children, social goals would have received more attention. Once again, due to the focus being from the entry point of emotion, social variables have been accommodated as relevant to the role of emotion in task engagement.

Through incorporating Nuthall's (2000) model of learning and Lazarus's (1991) cognitive-motivational-relational theory of emotions into my proposed model of decision-making, my findings have also confirmed the entwined nature of the three functions of the mind. Although this is a complex and entwined dynamic function, my findings confirm that this complex process may be quickly accessed through the simple question of what emotion is being experienced. This also implies that the communicative theory of emotion (Oatley & Johnson-Laird, 1998) explains the way in to both cognition and motivation. The present methodology supports this.

The Modified ESM –This Method Works for a Quick Diagnosis

As demonstrated in detail throughout this thesis, the modified experience sampling methodology (ESM) has been a successful exploratory research procedure. At the commencement of my research, apart from being specifically interested in children's classroom emotions, originally focused through the lens of the three functions of the mind (Snow et al, 1996), my question was wide open. Would it be possible to elicit emotion data from these young subjects in the busy classroom context? Further would it be possible to link emotion data with children's learning task engagement and their eventual learning?

The modified ESM evolved through the series of six classroom studies that I was involved with. By the time I had finished interviewing the target children in Study 16, I had become more skilled in showing video-clips of specific events to elicit moment by moment emotion data. For example, I set up a second specific video-cued interview process and elicited moment by moment emotion data for the "Dancing Raisins" experiment, from the four target children in Study 16. These data showed individual differences in their emotions, which appeared to relate to what they actually learned from that experiment. This prompted the next question for me as to whether I could try on-line emotion data collection during activities, with the intention of triangulating the video-cued interview data for individual children in Studies 17 and 18. As discussed earlier in my thesis, the mood slips were originally designed for this purpose.

Having later modelled the correlational methods of Zelenski and Larsen (2000) with similar correlations found, the factor analysis was an exploratory analysis. The three factors emerging confirmed that the responses of the children on the mood slips were not random responses. Each cluster of emotions seemed to share something in common. Generally when a factor analysis results in items falling into meaningful groupings, a real relationship is being uncovered by the analysis. To this extent, the statistical analyses have uncovered the structure of individual differences in the structure of emotions – for this sample. However, because these results were logical and comparable to those from university student populations, they indicate that the findings are robust enough to draw tentative conclusions about children of this age group in these types of classroom settings and events in New Zealand. This confidence is further supported by the finding that the present cluster of Factor 2 emotions grouped interested, curious and excited together, according to Lazarus's (1991) category of non-emotions. The present cluster has been labelled differently, but the emotions themselves have clustered in this way consistent with

Lazarus (1991). Similarly, to have obtained the separation of happy from the Factor 2 cluster confirms the logic of the data, consistent with and providing a different perspective on how positive emotions relate to increased performance and creativity (Isen, 1990).

The modified ESM was a novel method of data collection with a sample population, which is difficult to access in the normal course of events, particularly in their naturalistic environment. Due to the intensive, thorough and meticulous methodology of the Project on Learning, a wealth of valid and reliable data on the children's lived experience in the classroom has been obtained without interruption, over every 15-second interval that was spent in these classrooms. Incorporating the modified ESM procedures was virtually an experiment, through which a range of exploratory analyses has yielded solid results as reported in my thesis. In addition, the solid results are consistent with those obtained by previous ESM researchers yet using a modified simpler mood probe. It was a very quick method taking less than fifteen seconds in most cases, without interrupting the children's stream of experience (Rathunde, 1993). Therefore this makes a very useful contribution to the ESM research field. As demonstrated in the previous literature findings, having to account for all the variables at the time of sampling, means that the ESM questionnaires or tools are quite lengthy and time consuming – let alone potentially confusing for children under 11 years of age (Boekaerts, 2002). While smiley faces can be usefully employed for younger children, they still only generally categorise smiles or frowns rather than indicate specific emotions.

My results show that it is possible to use specific emotion words with children of this age. Therefore the modified mood probes could be trialled with different populations across different school settings. The mood probes themselves could also be modified if required. Due to the reliability of the self-reports of these children having been confirmed through the triangulated data in the present study, it would be worth trialling this method even without all the naturalistic environmental data being recorded in such detail. For example, a different sample of children could complete mood slips and the observer could include their immediate reason at the time. We have seen that their core relational themes (Lazarus, 1991) were similar to adults, and based on the present argument that emotion is a diagnostic tool for how things are going, that should be all that is required – followed by an interview immediately afterwards. This could be the focus of future research consistent with the aims of improving the emotional experiences and hence the learning experiences of elementary school children – and their teachers – who spend most of the children's formative years together in these compulsory contexts.

It is also important to acknowledge that replicating this methodology with a different sample in a different setting may obtain different or similar results. Finally in relation to the mixed methodology, it has been an honest effort to combine genuine statistical methods and genuine qualitative methods. Each set of findings stands in their own right, and together they demonstrate just how similar the emotional experience of children is compared to adults. The additional emotion of "stressed" has been identified as a significant academic emotion, only because it was included on the mood slip. Once again the children's core relational themes for this emotion were similar to the anecdotal reports from adults. Although the specific antecedents or consequences to the children's emotions might differ from adults, the similarity in core relational themes means that the reader should ask her/himself, "How would I be feeling in these situations? How would I feel if I was forever labelled as to my ability, based on a PAT test that I had sat, on a hot north-westerly afternoon, (Nuthall, 2001) when I didn't have a decent pencil or pen, and the kid next to me was being annoying?" Your answer will tell you how the child is probably feeling.

When a teacher has thirty or more children in her class it may feel too daunting to imagine that she also now needs to cater for their emotional needs. My findings demonstrate how through detailed observation and talking with the children *only* about their school experiences, I have found the contextual effects of the classroom on their emotions and learning. While there will be specific children whose private lives might need to be disclosed, my findings demonstrate that the children's sociohistory (Schutz & DeCuir, 2002) in the classroom context is the most important history that is needed. For example, in adult education, the (sometimes thirty or more) participants are invited to leave their day to day worries at the door, and we see it as our responsibility to cognitively engage these adult students in authentic tasks. By acknowledging that their time investment in the classroom deserves it to meaningful, as their learning facilitator I am also acknowledging that they are individuals without having to psychoanalyse or label them. Many of the adults I work with have had repeated school experiences similar to Dion and they too are equally surprised when after a single morning session actively engaged in an interesting relevant "authentic" learning task, they realise that they can actually learn and achieve learning easily. A lifetime's perception that they are "dumb" can be overturned through one positive learning interaction. However, in order for that to predict a desire for continued learning, the first success needs to be repeated so that positive emotions can become conditioned with being in an academic context, and with learning. I have shown the structure of children's emotions to be the same as adult students. We now need to treat them with the same respect and value.

One caution in this would be that while their emotions are as valid as adults, this does not mean that we should expect them to *be* adults. For example, anecdotal evidence is that if someone is being childish they might be told to "grow up" or "that's not how an adult would behave". These are different issues. By arguing this similarity, I am arguing that children need to be treated with respect as individuals with psychological skills and wisdom, just as we should and would treat our adult students.

As observers we have been privileged to see what is happening in the classroom more than the teacher might possibly hope to see. Yet the data show how one 15-second interval can make a difference. For example, both Dion and Abby did increase their rate of task engagement after being told they were "good". All it would need would be to be more specific in what is observed and said in that 15-second interval to support the positive emotions and learning achievement. In addition to increasing the rate of these sorts of interactions, a new method of correcting children's work that respects their privacy – as we would an adult, would reduce the negative emotions and the sense of risk that there might be an embarrassing event looming. My results have demonstrated that these emotions do not foster learning so they should be eliminated if at all possible.

Finally, I cannot emphasise enough that children's classroom emotions are providing information about the context at the time, and the impact of that context on their lives at that moment. Children can move from feeling bored to feeling interested if the task can be made meaningful and relevant. Not every negative emotion can be attributed to home problems, and most are responses to classroom events. Some emotions reported did relate to other events. For example, losing the netball or anticipating speeches or the athletics sports contributed to children feeling annoyed or nervous in the classroom either before or after the event. Similarly, upcoming birthday parties elicited excitement for the few days prior. However, because these emotions have not been specifically conditioned to the specific classroom event at the time, these emotions can be over-ridden by the current stimulus. For example, if the task is engaging and relevant to the child, she might become interested in that task irrespective of the other emotions.

As educators, we need to move from a "blame the child" (Yair, 2000, p. 206) mentality about their emotions to identifying what's happening in the here and now in this particular classroom for this particular child. As Lazarus (1991) has explained, an emotion occurs within an individual "with a distinctive history, who wants, thinks, and confronts specific environments, evaluates

their significance, and acts as adaptively as possible" (p. 7). Emotions tell us about what is important. They also tell us about "how a person has appraised (evaluated) an encounter with respect to its significance for well-being" (Lazarus, 1991, p. 22), confirming the usefulness of starting with emotion as a diagnostic.

As demonstrated in the statistical results, the interested, curious and excited children in these classrooms were not significantly stressed, bored or angry. Therefore an increase in the frequencies of the Factor 2 emotions should not only increase the numbers of happy students, it should also reduce the frequencies of negative emotions. Finding that in the whole nine days of Space Topic Dion had only 1 minute 45 seconds of ideas flowing – consistent with Csikszentmihalyi's (1975) flow – indicates that urgent action is needed for Dion. Unfortunately this occurred five years ago, and while Dion has taught us a lot, his elementary school career has not benefited from this. These children were half way through their school careers, with a long way to go at the time. Based on the present results, their future positive emotional experiences related to their learning may be at risk. By this stage in their school careers, there was already a wide gap between the higher and lower achievers, despite the evidence that each "achievement category" of child was fully capable of feeling interested, curious and excited and fully capable of learning. However, even by 9 – 11 years of age, it would have required a major intervention across the whole class to bring all the children up to their optimum emotion and learning potential.

During an interview with Scherer (2002) Csikszentmihalyi suggested "that the best thing would be to forbid children to go to school until they can demonstrate that they have a real interest in something" (p. 4). It is unlikely that this would be acceptable in the New Zealand context, but if that attitude could be introduced into how the children enter the classroom each day, it would be a good start. Based on other ESM research these years may be the emotional peak time prior to adolescence. These children deserve to be higher in their frequencies of happy and Factor 2 at this stage in order to cope with not only the academic challenges of the next few years, but also their developmental challenges.

My original research question was "Investigating the role of emotion in children's learning task engagement in the elementary school classroom". When I tell lay people that I have spent the last six to seven years of my life researching and analysing this question, it often becomes a humorous conversation. Anecdotally "everyone knows" that you have to be interested in

something to want to do it or learn it, and that it's not good to be bored. How on earth could it have taken so long to do this research and so many pages to answer this question? That is certainly a question. The literature on the need for children to be interested goes back a long way. For example John Locke in the 17th century, said that teachers must appeal to children's curiosity because "where there is no desire there will be no industry" (Garforth, 1964, p. 12), and in 1913 Dewey also argued that students need to be interested. But despite the wealth of evidence in the literature and in this thesis, that feeling interested is important and necessary, it is difficult to achieve for every child in the classroom. As demonstrated by the teachers' attributions about able students and boredom, have we as educators fallen into the trap of being selectively socio-constructive – that interest is only available for the higher achievers?

As to why it takes so long, this thesis has demonstrated that access to classroom environments, in which real life learning situations occur, is a time-consuming and costly business. In order to demonstrate that young children's emotions are as valid as adults, and relevant to their learning, this has been the only way to do it. Further, it is a unique and enormous privilege to have been invited into these classrooms to observe these teachers and children for the length of time that we had with them. The data show just how much of classroom life, experience and activity goes on without being seen by the teacher, and which can only be captured by recording all the variables at the time. This in turn was only possible through the multiple methods and the technology that supported these. As a result, the wealth of data then takes years to transcribe, code, collate and analyse. In addition, as argued throughout my thesis, emotion is complex and its experience is unique for every individual. However, being informed by Lazarus (1991), Oatley (1992), the search for emotion's role in the classroom has been advanced. But this work is still far from being finished.

Has my research question been answered? Not fully of course, but I certainly thank our young psychologically aware subjects, for their enormous contribution towards finding an answer to this question. From the statistical analyses which provided evidence of the significance of emotion, through to the in-depth qualitative analyses relating to the entwined three functions of the mind, to actual emotion experiences in the classroom and to subsequent learning, the role of emotion has been exposed a little more than before. Nuthall (1999) suggested earlier that we needed to find out more about how attitudes to learning and initiating learning activities or tasks might evolve in the classroom. My findings demonstrate that just as ability is shaped by the classroom (Nuthall, 1999), so too are children's attitudes to learning. Apart from the role of positive

emotions in facilitating learning, the role of emotion as a communicator (Jenkins & Oatley, 1998) has been shown to be a very useful diagnostic indicator of how they were getting along (Lazarus, 1991) in their classroom activities. How the children were feeling has told us whether they were able to engage in the tasks or not. How they were feeling readily accessed their cognitions and motivations. From the perspective of Lazarus (1991), their emotions were tied up with their appraisals in response to the significant impact of the most relevant variable at the time, as they attempted to proceed with the most pressing business at hand. How they were feeling, has told us that their needs were either being met or not, which was going to impact whether they could engage with the task or not.

Finally and most importantly, my findings have demonstrated that any of the target children irrespective of their perceived ability (as measured through PAT achievement levels) were capable of experiencing the full Factor 2 emotions of interested, curious and excited. This is consistent with Nuthall and Alton-Lee's (1997) finding that irrespective of perceived ability any child can learn provided they have sufficient opportunities to engage with the new material. Nuthall's findings are provocative, indicating that we over-rate ability measures which especially if they are norm-referenced, are not going to tell you anything about how the individual learner learns. My findings support the "anyone can do it" attitude. They also suggest that if the classroom shapes minds (Nuthall, 1999) it does this through emotional conditioning effects, which are being built upon all the time with every success or failure. The best and only way to find this out is through listening to the children. As Nuthall (1999) has said:

> In the end only direct evidence from students themselves can be the guide to the cognitive processes involved in carrying out classroom tasks (Nuthall, 1999, p36-37).

The strength of my thesis is that it has been a way of listening to these children, and valuing their wisdom. There is much more wisdom to share from these children, but the first purpose has been achieved. These findings confirm that we have to value and consult our children more in order to facilitate their learning. They are after all the ones who will be taking over the future – and who might just support us when we're old.

Implications – What These Findings Might Mean for Pedagogy

Throughout my thesis I have discussed implications for pedagogy as they have arisen. Personally, I would rather that teachers respond to these findings themselves in preference to me telling them what they should make of them. However for education in general there are some implications or recommendations that I wish to make.

Gender Issues – The Social Implications of Learning

The evidence of statistically significant learning and achievement differences between genders in relation to positive classroom emotions warrants further attention. Girls reported the Factor 2 emotions of interested, curious and excited more frequently than boys. They also reported happy more frequently. Having also found that these emotions were related to learning and task engagement – irrespective of achievement and gender, there is need for further investigation. For example, does this reflect their better relations with the teacher, as Valeski and Stipek (2001) found? Is this the result of a well-trained habit of pleasing their significant adults (Altermatt & Pomerantz, 2003)?

Based on the concept of emotional intersubjectivity (Denzin, 1984; Schutz & DeCuir, 2002), by Years 5 and 6, might the girls have been socialised in this way over the preceding years because emotional intersubjectivity occurs more readily between girls and their female teachers? Considering the importance of intersubjectivity to scaffolding in the ZPD (Smith, 1998), this question needs to be explored. For example, does the better achievement of girls actually reflect the more effective intuitive ZPD scaffolding that occurs between female teachers and girls? Based on my qualitative data there was no obvious evidence of deliberate scaffolding by the teachers for the girls. However, we saw that the girls managed the resources better, especially Lois. Selma, too, did not give up the book to Dion, and recall also that the teacher photocopied the Sea of Tranquillity material for Bernice and another girl. Might this suggest something about girls' organisational skills being fostered?

How might the present findings on gender related to Maths achievement relate to the findings of Townsend and Hicks (1997), that girls entering secondary school show a decline in their maths achievement? Townsend and Hicks (1997) found contextual variables were associated especially girls' social satisfaction. Might this have something to do with having less control of their

environment compared to the elementary school context? Might this have something to do with the loss of their exclusive teacher, with whom they had emotional intersubjectivity?

What specific processes create this inequity in the elementary school classroom? My data show that there are no ability reasons why girls should be enjoying school more.

How Feasible is the Socio-Constructivist Perspective?

My discussion on the theoretical perspectives included arguments for both positive and negative replies to the above question. There is one body of thought that argues it is not possible to "do" constructivism without the full context also "doing" constructivism (Lapadat, 2000; Windschitl, 1999). The opposite argument is that constructivism can start small and make some difference simply by creating authentic tasks (Yair, 2000). This makes sense because it might be possible to create one school as constructivist, but then the Ministry of Education in the broader context will not necessarily change. Therefore starting small with tasks is probably the best and only option. The argument for authentic tasks has been well argued (Yair, 2000).

My analyses demonstrated that when the right question was asked - namely to find a new and interesting fact, every child – irrespective of gender and ability - was capable of finding something new and learning it. McPhail et al (2000) further found that the structure of any domain that children were interested in as their first choice, actually reflected their own cognitive structures. For example, children who preferred science as a curriculum topic would also choose scientific activities in their day to day preferences of things to do. Comparing this to my findings, within the confines of *one* domain, children chose tasks first that they could achieve in optimum conditions, these conditions reflecting their self-awareness of their own skills and knowledge and so on. Despite this choice being confined to the one domain, they still made a choice and they still felt more interested about the things they specifically chose.

Is there also something about the psychology of choice that immediately creates interest? For example, Lazarus (1991) has explained interest as a state of readiness and waiting to see what might happen next. Might this be a good state to induce every time we want children to be ready to learn? The answer is yes, of course, not only from my findings but also from the wealth of research already done in the area of interest (for example, Ainley, Hilman & Hidi, 2002).

Therefore why not start to look at a specific sociocognitive focus in the area of tasks themselves – a microcosm of constructivism if you will.

For example, it was suggested that teaching about gravity could be done with skateboards (Crawford, Krajcik and Marx, 1999). In this science task the children would not only be scientists testing out gravity as they tried out different moves or postures to test gravity, they would also be skateboarding. This sounds like fun and would also be interesting. It seems to me that one of the issues is that teachers approach the curriculum from the perspective of adults trying to think of interesting ways to teach a topic to children. Once everyone has agreed and time is spent preparing, there is less flexibility to change just because children are bored, and naturally "let's just get it over and done with". However this has taken time and energy and correlated with negative emotions rather than positive emotions. Of course we also know that the less positive emotions there are, the less creativity and so on. What would happen if the teacher asked the children themselves to come up with interesting ways that they should be taught a particular concept?

The New Zealand Curriculum Framework is designed to be flexible. Consistent with concerns expressed by the teachers in the Project on Learning, Professor Terry Crooks stated the following:

> Teachers are under pressure to cover the curriculum, which tends to undermine their ability to enjoy teaching and make learning interesting for students. The curriculum needs to shift the balance between choice and compulsion, between surface and deep coverage and between interest and boredom/stress – for teachers as well as students. This would allow teachers to then focus more on the intellectual and resource needs of their students (Professor Terry Crooks, Phone Meeting in the Education Department at the University of Canterbury 14.10.2005).

One possibility might be to encourage collaboration between teachers and children with task design. For example, teachers and children together could look at the learning outcomes and work out ways to best learn them. Here is what Tyler suggested for one task.

I: So if you were wanting to suggest a way of getting kids attention in class, what would be a good thing to do to make sure you can pay attention?

T: Well give them an interesting task to do like if you tell them what to write out the times table ten times up to the twelfth, that'll be quite boring.

T: Can I show you just need a pen and a piece of paper?
For word study we have - like say you gave us a sheet (it) would have like caricatures of hidden meanings of words and like um..

T *draws out his example on paper*

T: You have to find the hidden meaning out of that.
I: Oh right. So it's a word with lines round it kind of thing.
I : So that's sort of an example of something interesting.
T: Yeah.

The relevance of this excerpt to my argument is that every time the children were given an opportunity to suggest ways to teach or learn something during interview, they had ideas. They did not say they needed to look anything up or have a meeting. They were able to generate good ideas on the spot. The other important feature of their ideas was that to design the task, they were thinking about and embedding the concept and therefore learning it before they actually planned to learn it in the task they were designing. For example, Tyler had to create the hidden meanings first to create the activity above. This did not take him much time.

As indicated in my thesis, each child may have their own response to how a topic could be taught to make it interesting, but even just thinking about how it could be taught would be creating interest and enabling learning of the concept. Anecdotally, teachers say that they might not have known or understood a concept but when they had to teach it, preparing the tasks and activities meant that they learnt the concept. As a further example, Nellie (Study 13) and her friends used to write secret notes to each other. When they were studying Egypt, they chose to focus on hieroglyphics. Nellie explained to me that her social secret note writing was usually in code, so that she and her friends were already skilled at learning new languages because of understanding the code process. Next, she explained how she gave extra coaching in these hieroglyphics to one of the other girls in the lunch breaks, so she could keep up in their social note writing.

Imagine how much more interesting teaching would be for teachers also, if children could contribute to the task design based on incorporating the new concepts for learning. In terms of knowledge transfer, several children might come up with different ways that a concept could be taught. That would immediately encourage analysis of how the task actually might or might not teach the concept and if each different idea would effectively teach the concept, the concept would be correctly transferred from idea to idea. Even if the ideas were *not* going to work, analysis towards that decision would mean that the concept would be rehearsed and attended to and learned. Similar to the skateboard example above, there is enormous scope for "doing" socio-constructivism at the task design level. This should be fostered and investigated further.

Teacher education needs to include more academic support for understanding socio-constructivism and what the ZPD actually means in practical ways. For example, just because the children were happy and apparently engaged in their tasks (neither of which impressions were 100% accurate across the classes), this did not mean they did not need the teacher. This would mean the opposite in terms of using the ZPD. This would be the right time to extend each child's skill level that little bit further. Under the socio-constructivist perspective that would be the time the teacher would be needed the most.

Teacher education must also include relevant child developmental theory, and this must be revisited throughout the years of teaching as professional development. As we saw from my findings, teachers' lives are very busy on a daily basis. They rarely - if ever - get the opportunity to sit and observe in a classroom and observe their children in the ways that we have with the Project on Learning. Teachers who are upgrading to degrees or masters level are generally required to undertake some sort of classroom based research, and for many this becomes a pivotal experience in their renewed understanding that just because they are teaching or telling something, it doesn't mean that learning is automatically occurring.

The only way teachers are going to get such opportunities is through the government acknowledging that this is necessary and funding teachers to spend time researching and observing in the classroom. Recently my colleague and I shared some of our findings with the teaching community in Rotorua at the invitation of the Rotorua Principals' Association. This group was committed to professional development and released the teaching staff from the whole area for the day to attend our seminar. The Boards of Trustees were also invited to an evening session. As a result, this teaching community vigorously debated many relevant issues and their potential impact on their own teaching, which was the goal of the principals. Although there are many education conferences throughout New Zealand in any given year, very few classroom teachers would get the opportunity to attend and inform their current practice, let alone have a day's release from teaching to sit in a colleague's classroom.

Teacher education needs to support better theoretical understanding of emotion, motivation and cognition. I would like to see teachers educated in emotional theory but with great care to avoid psychoanalytical or counselling aspects which would be beyond the scope of a classroom teacher's professional practice and which could be dangerous. For example, children are not taught to take notice of their emotions, or to understand that they are communicative, unless they

are seen to have a problem with anger. The notion of anger management has always indicated to me that we will allow children or anyone to be angry as long as they manage it. This is an important aspect. But why not think about anger prevention? What does this anger signal? Lazarus's (1991) core relational theme for anger indicates that we need to address why we are angry, and deal with that. Similarly for the other emotions as we have seen. Emotions occur for a reason, so let us attend to the reason and facilitate positive emotions. As I explained at the beginning of my thesis the Effectiveness model (Gordon, 1975) is one version of such training. Anecdotally I understand that Harvard University is fostering emotional intelligence (Goleman, 1995) training for children. As part of future research I would like to visit there and see what they are doing – perhaps as a post-doctoral reward or scholarship.

Finally on constructivist pedagogy the assumptions and incorrect beliefs in education about ability are shaping the futures of thousands of children. This needs to be addressed urgently. There is plenty of anecdotal evidence of the results of negative outcomes of schooling – this needs to be re-evaluated in the light of the national belief about ability. From my analyses, these ability categories are also influencing who gets the resources. How much this predicts the future for these children is not known. For example, has Dion generalised the learning that he has to wait until his higher achieving peers have finished with the resource?

Finally, ask the children. If the main implication taken from my thesis is that we need to listen to children, this will be a good start. Is what is happening for our children good enough? Would it be good enough for you?

Future Research

Given the five year gap between then and now, I would like to re-interview the same target children about their memories of the experience and any significant impact from my research. For example, do they remember the experience, and whether it made any difference back then or now? Where are they now? Did any of the emotion data predict their secondary school approach to learning? Are any of my concerns about the longer-term outcomes of these experiences valid?

There was already a gap between the high and low achievers at Years 5 and 6. This modified ESM methodology could be trialled with even younger children. Is the onset of emotional satisfaction or dissatisfaction something we can pick up earlier? How soon does it show up? We

could try and get emotion readings from younger children and see. For example, many of the findings on intersubjectivity are derived from pre-school children. How does intersubjectivity occur for these children in their transition to elementary school? What are the structural differences between the pre-school, the new-entrant and the Year 5-6 classroom that might create impediments to intersubjectivity with the children's increasing age? A longitudinal study using ESM through the years might be one way to detect whether the present findings are true across time, or whether they have reduced or increased since the children have started school. Where might such findings sit in relation to perceived ability? If norm referenced achievement testing commences in Levels 3 or 4 (Standard Two), is this when we might expect to find different frequencies of emotions for children based on their ability labels? What happens to children who have been going to school for two or three years quite happily, and then one day they do a test and then they find that that they are not smart?

Perhaps a research project could be set up to investigate ways to improve emotional intersubjectivity (Denzin, 1984). This might be achieved with emotional intelligence training or similar or one designed myself based on these findings. I could work with teachers and students on trying out boredom and interest as diagnostics. This could involve teachers and children working together in an action research project (Atweh, Kemmis & Weeks, 1998). For this to work well academically it would still need to be under the supervision of university. This would also be consistent with the recommendations of educational psychologists that teachers and psychologists design and implement research projects based in the classroom (Snow, Corno & Jackson, 1996; Shuell, 1996).

Critique of Shortcomings in my Research

The prospect of continuing with this type of research is exciting to consider. Some of the lessons learned have been identified during my thesis. For example, changing the emotion words between Studies 17 and 18 seemed a good idea at the time, because I had not anticipated conducting the statistical analyses. Therefore in future I would keep the vocabulary consistent across more than one classroom or study. I might also include the word "proud" with "ashamed" as its opposite, because it came up during the latter study, and is a strong indicator of the children's perceptions of their academic outcomes. Alternatively, having identified the significant emotion factors for this sample, perhaps future research could focus on these specific emotions with a different sample or samples.

The video-cued interviews resulted in far more data than was needed for my thesis. However I was intent on making the most of the opportunity to obtain these rich data as I could recognise the potential in this opportunity. It is unlikely that this particular methodology will be replicated to this extent in the near future, so that these data will be useful for further analyses, beyond this doctoral work. Also during the earlier interviews I was very excited about the ways the children were talking to me and I occasionally forgot to come back to specific questions of interest. Next time I might give them more control over which events we discuss during the video-cued interviews, but I would still want to obtain comparative experiences of the same events. However, I would continue with a semi-structured process, as it is often the unexpected things that children say that lead to unexpected and significant findings.

There has been a time lapse of five years between data collection and analysis and writing up. As explained above, this was inevitable but these children are five years older now and they personally have not benefited in their elementary school contexts. While this has protected their identities well, it would have been appropriate – given the in-depth analyses they afforded, to have been able to assist these children as a result. For example, it would have been a way of reimbursing these children for their contribution, to have scaffolded them personally. For example, perhaps Dion could have been taught visual methods of sorting information such as mind maps, as well as practising ways to ask for what he needed.

Finally, I would probably give the teachers a copy of Sutton and Conway's (2001) article on teachers' emotions and invite them to participate by also filling out the mood slips. In general I would modify some aspects of the methodology, but overall for an exploratory study, I am reasonably satisfied with the outcome.

Parting Words

Finally I shall let the children have the last word. As each child left their interview, I thanked them for their time and for their assistance with my research, which was trying to find out how children learn. Here are just three examples of their genuine farewells to me, which I presented in the methdology chapter, and which I now present again to you my reader/s.

"Oh well thank you for giving me this opportunity to actually tell you what I know, without, like anyone interrupting me and telling me - no this is total nonsense"
(Tyler)

"That is my pleasure to help you"
(Kitty)

"My pleasure"
(Kellie)

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Appendix 1: Behaviour Codes

A. Getting and clarifying instructions

1. Teacher gives general instructions at beginning of activity to whole class
2. Teacher gives instructions during activity
    - 2.1 Instructions to the whole class
        - 2.1.1 Teacher gives instructions about moving along
        - 2.1.2 Teacher models what groups should be doing by making an example of one group
        - 2.1.3 Teacher gives instructions about specific activity or corrects activity
    - 2.2 Instruction to a specific group
        - 2.2.1 Questions what a group is doing
        - 2.2.2 Corrects what group is doing
        - 2.2.3 Praises a group for what they are doing
        - 2.2.4 Gives specific instructions to a group
        - 2.2.5 Re-organises seating or individual roles
        - 2.2.6 Re-organises the way the group is working
3. Pupils read prepared instruction sheet
    - 3.1 Reading instruction sheet at the beginning of the activity
    - 3.2 Reading the instruction sheet during the activity
    - 3.3 Asking peer about what the instructions are

B. Interpreting instructions and organising resources

1. Socially interactive interpretation and organising
    - 1.1 Mutually co-operative interpretation and organisation
    - 1.2 Debate and negotiation of interpretation and organisation
    - 1.3 Negotiating the exchange of resources
    - 1.4 Organising other children to organise resources
    - 1.5 Organising who should work with who
    - 1.6 Asking other students for help in organising resources

Appendix 1: Behaviour Codes

2. Interacting with teacher about finding or organising resources

2.1 Asking the teacher for help to find resources

2.2 Getting help from teacher to find or organise resources

3. Individually getting, arranging resources

C. Carrying out the procedures required by instructions

1. Individual organises and carries out the required procedure

1.1 An individual organises and carries out the procedure (others may be watching, but not contributing)

1.2 Watching passively while others carry out the procedure

1.3 One person tries to correct the activity

2. Group carry out procedure together

2.1 One person organises another to carry out the procedure

2.2 Group carry out the procedure co-operatively but without comment

2.3 Group carry out procedure, commenting on what they are doing (e.g. asking each other what they are doing)

2.4 Reporting to each other what they have done (procedures)

3. Peer group talking about observations and results

3.1 Group talking about what they observe

3.2 Student tells others the results of the procedure

4. Group talking with each other about reasons, explanations

5. Talking with teacher about observations and results

5.1 Reporting to the teacher what they observed during the activity.

5.2. Talking interactively with the teacher about observations and results during the procedure.

6. Talking with the teacher about reasons, explanations

6.1 Teacher asks them for their explanations

6.2 Teacher provides cues or a model for explanation

7. Teacher carries out the procedure with the group, instructing them in detail, or modelling the procedure.

7.1 Teacher goes through a sequence of activities

7.2 Teacher corrects a specific procedure

8. Group carries out an incorrect or misinterpreted procedure or an accident occurs with the materials

9. Engaging in alternative and playful activities and uses of resources

9.1 Individual playful and alternative activities

9.2 Socially interactive playful and alternative activities

D. Social interaction unrelated to task procedures

1. Positive social interactions about unrelated topic within group
2. Positive social interactions about unrelated topic with non-group member
3. Social interactions involving personal conflict unrelated to activity

E. Writing the report

1. Organising pupil's own topic book, line sheet, pens, pencils, ruler

1.1 Organising materials individually

1.2 Organising interactively with others

2. Obtaining copy of instruction sheet
3. Finding out what to write, what questions to answer, how to complete the report individually or interactively with peers

3.1 Reading instruction sheet

3.2 Asking peers about what to do in report.

3.3 Talking with peers about what to do in report, what to write, how to complete it, what are the answers.

4. Discussing what to write in report, how to complete it, with the teacher

4.1 Asking teacher about what to write in the report.

4.2 Teacher gives specific instructions to student about report

4.3 Teacher reads and comments on a pupil's report.

5. Discussing what they have written in their report

5.1 Talking about what they have written

5.2 Talking about the mistakes with each other or teacher

6. Writing the report

6.1 Copying title and questions from instruction sheets

6.2 Writing what they did

6.3 Writing, or making a drawing of, what they saw, observed

6.4 Writing an explanation or reason for what happened

7. Student reads own writing just completed or from previous day's work
8. Reading another pupil's writing in the report.

F. Spending time doing nothing active

1. Gazing round the room, looking at others working or teacher talking to another group
2. Student pauses during activity, apparently unsure, confused
3. Reading over previous days work that is not relevant

Appendix 2

Preliminary Semi-structured Interview format.

Welcome

Video on with group or mat activities

We'll take a look at some of the video from when we were in class

What was happening there

What were you thinking

What were you feeling

What sort of mood were you in

What sort of mood do you get in when you are doing .....(the thing they mentioned)?

What does it mean when people say they are in a certain mood? What do you think the word "mood" means? What is emotion?

What sort of mood do you get in when you are doing .....(the thing they mentioned)?

I noticed that....(something salient about the event)

What were you thinking about at that point?

How were you feeling at that point?

I'm very interested to hear about what being in class feels like for you, especially if you're doing classwork that the teacher wants you to do. I am also very interested in what you think helps kids learn in school. Like, do you think that you need to be a certain mood or anything?

So what are you thinking about right now...how does that feel?

Can you remember if you felt in any sort of mood during... (the event observed)

Was it the same mood you started off the day in today?

What sort of mood are you in when you get up, or are going off to school?

Do you stay in the same mood all day?

What sort of thing might change your mood?

When I say the word "mathematics", does that put you in any sort of mood?

How about Social studies ?

How about science?

How about being interviewed? What are you thinking right now? What sort of mood are you in right now?

If you really wanted to get yourself into a good mood, how would you do that?

If you think about what subjects you find easiest, what sort of mood does that put you in?

What about the hardest school work? Does that make you feel in different mood?

Do you ever get bored in school?

And what does that feel like?

How can you tell if you're bored?

So how does that feel?

How do you feel when something interesting is happening, or when you are doing something interesting?

You said you liked .... How does it feel when you like doing something/learning something you like?

Can you finish this sentence for me: when I am doing something I like, I feel...."

I have list of words here. We'll go down the list together, and I'd like you to get me to tick any of the words which are feelings (emotions/moods) you have experienced in school.
You might also be able to tell me what was happening at the time, like what were you thinking?

Appendix 3

List of Emotion Words

Happy
Curious
Interested
Relaxed
Sad
Nervous
Angry
Worried
Anxious
Scared
Fearful
Proud
Ashamed
Shamed out
Bored
Jealous
Excited
Stressed
Friendly
Guilty
Cheerful
Shy
Hopeful
Despair
Embarrassed
Disgusted
Enthusiastic
Frustrated
Admiration
Love
Resigned

Appendix 4

Cloze Statements for Interviews

Ask the child to finish these sentences

When I am doing science the time goes

When I am doing science I am thinking about

When I am doing science I feel

The teacher wants me to do science because

I do science because

The hardest part about doing science is

When I get to the hard parts I

I think we should do more of

My real interest is

It would be interesting if we studied

My favourite person to work with is

When I work with this person I feel

There are some people I don't like working with

Working with them makes me feel

To sum up my mood when I'm doing science I would say I generally feel

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Appendix 1: Behaviour Codes

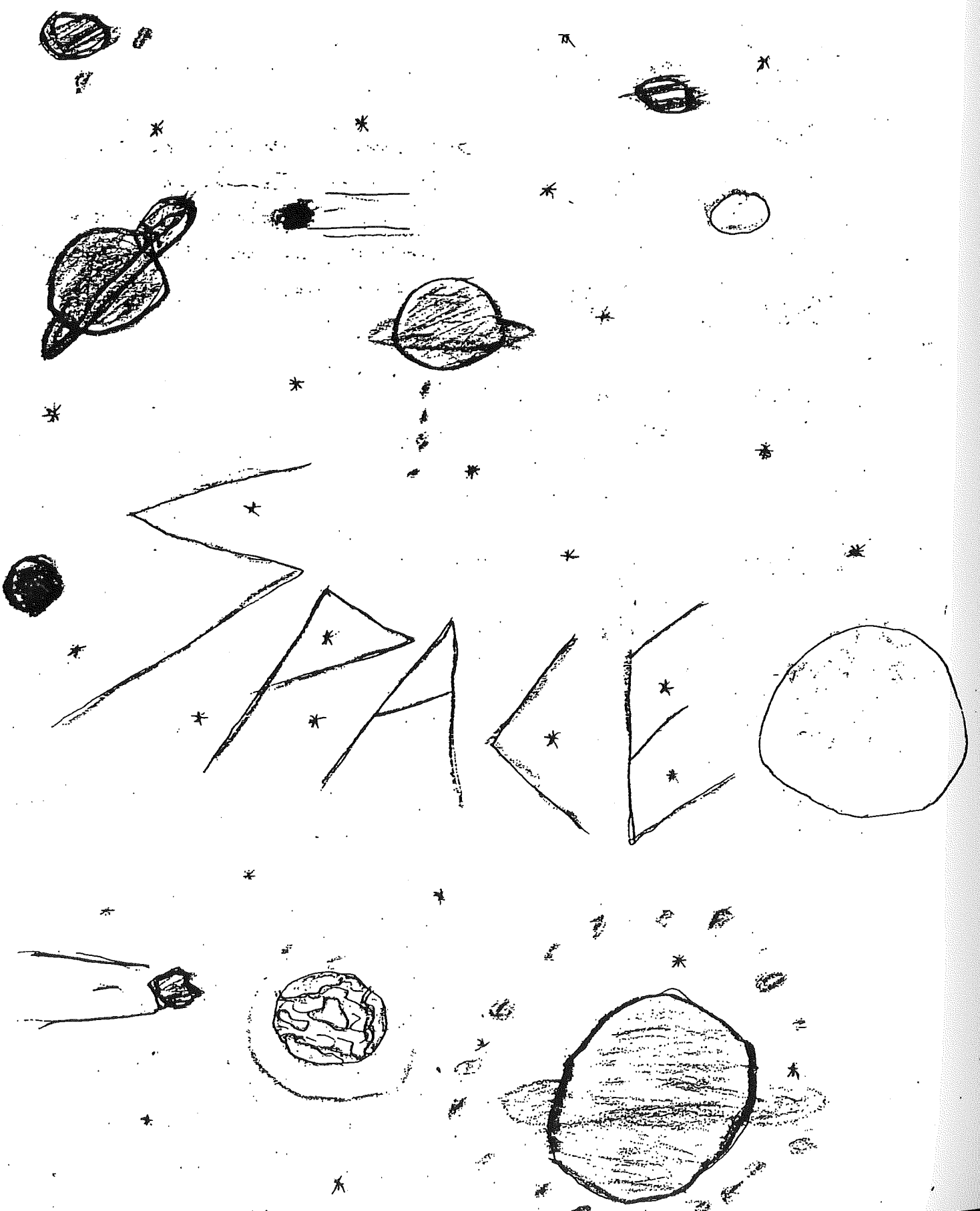
A. Getting and clarifying instructions

1. Teacher gives general instructions at beginning of activity to whole class
2. Teacher gives instructions during activity
    - 2.1 Instructions to the whole class
        - 2.1.1 Teacher gives instructions about moving along
        - 2.1.2 Teacher models what groups should be doing by making an example of one group
        - 2.1.3 Teacher gives instructions about specific activity or corrects activity
    - 2.2 Instruction to a specific group
        - 2.2.1 Questions what a group is doing
        - 2.2.2 Corrects what group is doing
        - 2.2.3 Praises a group for what they are doing
        - 2.2.4 Gives specific instructions to a group
        - 2.2.5 Re-organises seating or individual roles
        - 2.2.6 Re-organises the way the group is working
3. Pupils read prepared instruction sheet
    - 3.1 Reading instruction sheet at the beginning of the activity
    - 3.2 Reading the instruction sheet during the activity
    - 3.3 Asking peer about what the instructions are

B. Interpreting instructions and organising resources

1. Socially interactive interpretation and organising
    - 1.1 Mutually co-operative interpretation and organisation
    - 1.2 Debate and negotiation of interpretation and organisation
    - 1.3 Negotiating the exchange of resources
    - 1.4 Organising other children to organise resources
    - 1.5 Organising who should work with who
    - 1.6 Asking other students for help in organising resources

Appendix 5: Dion's topic book



SPACE CONTRACT

Name OIDN

I will complete the following work over the next five weeks.

KNOWLEDGE 2

(1)  3 4 5

COMPREHENSION 1

1 2 

ANALYSIS 1

1 2 3 

APPLICATION

1 (2) 3

SYNTHESIS 2

1 2 3 

EVALUATION

(1) 2 3 4

Signed _____

Comprehension. 3

Becasse Earth has ogyen. Earth has houses. Earth has humun beings. Earth has fresh water and ealty water. Earth has trees. Earth has rockets, planes, helecoplier and cars. and right heaf

Knowledge 2

An Astronaut	An Astronomer
Goes into space. Go in rokets	Studys on space and metors.

Synthesis 4

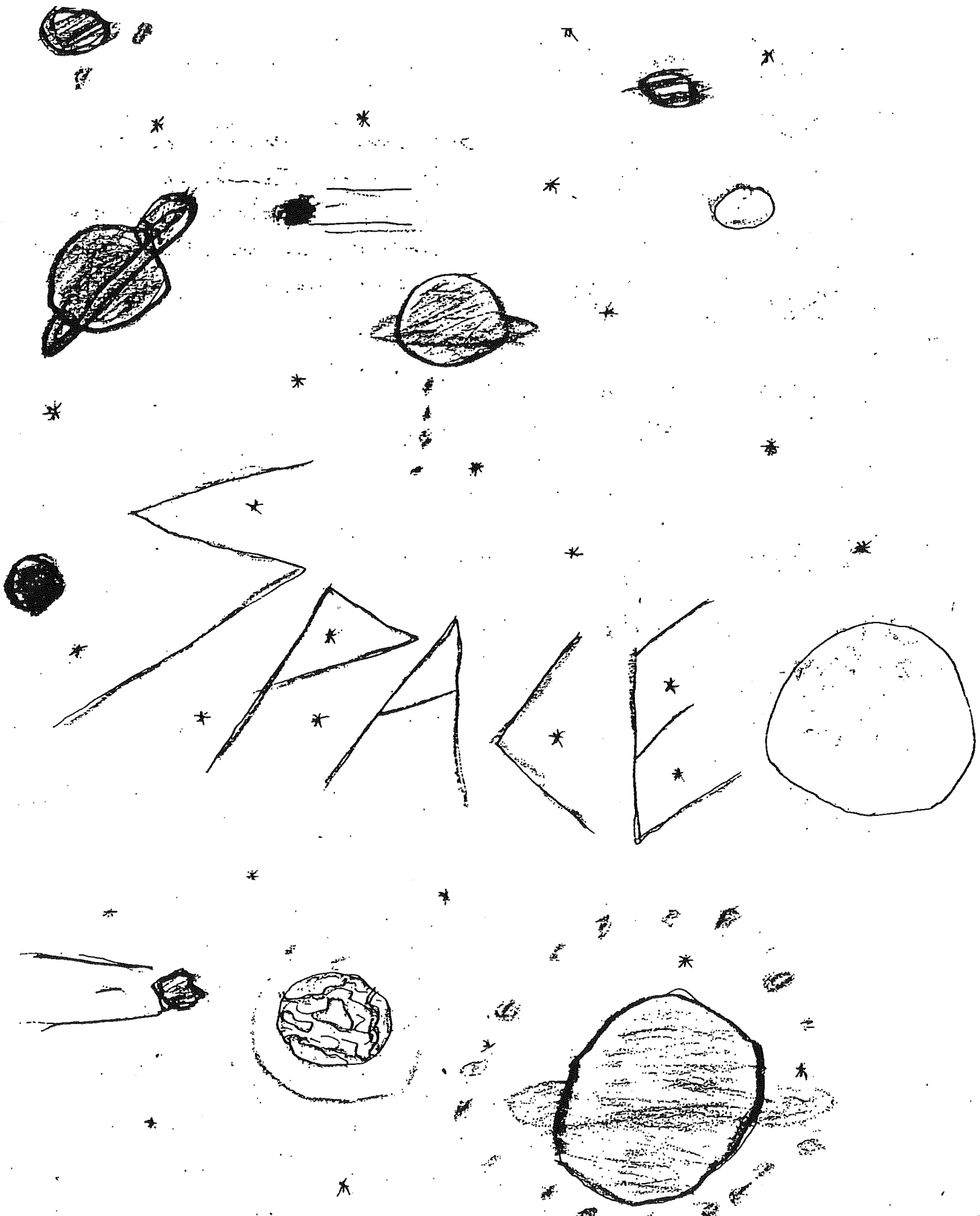
Abin attack

There was a happy town until aliens attacked. There names were Edwrad and Tae Young they had laser guns, they shot me in the arm and said. "?!/*" My arm fell off and I picked it up and threw it at Edwrad. I grew another arm I

Aliens attack

There was a happy town until aliens attacked. there Edward and Tae Young they had laser guns they shot me in the arm and said !?!* "My arm fell off and I picked it up and Put it back on. I grew another arm I got my Machine gun and shot them and they went real aliens its an illusion but then how did they shoot me my arm fell of again. I picked them up and threw them into the rubbish bin. They went thro the bin and crash into the brick wall and there was GREEN blood. I picked them up and threw them into the wall again and they died. HARRAY for Drey. Oh no, what said the crowd look there are heaps of blue father aliens 50 feet high, 2 meters long. They have big big laser guns the size of an elephant. Every body run Drey screamed loudly. Every one was screaming a couple of the got stoned. Flater than the flatest pancake and Drey was one of them. The had a Funerril until the king later body stoned them all and slei went The blood over the floor and 88 old men survied it but the gobi

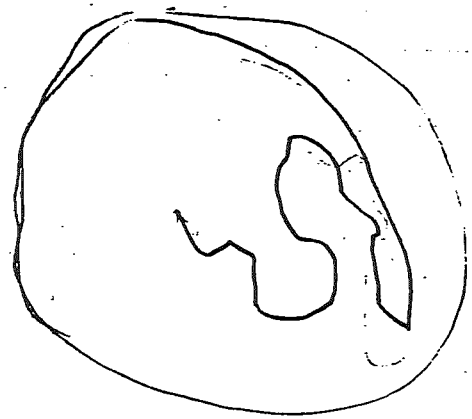
Appendix 5: Dion's topic book



ANALYSIS 4

No the sun is not a planet it is star.
The sun gives us heart, light, life and grow plants

KNOWLEDGE 1



THE Moon and its Orbit

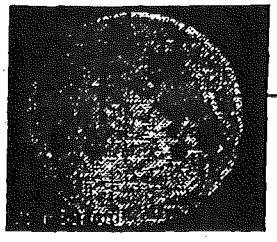
Cresn is, half, Half and a bit and a full moon and a new moon

Appendix 6: Sea of Tranquility Diagram and Dion's Drawing, Day 7

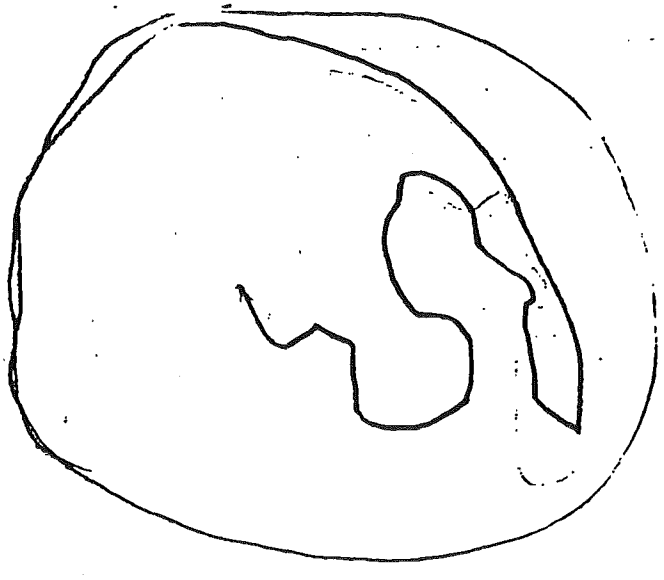
KNOWLEDGE

Locate the Sea of Tranquillity on a map of the Moon. Give names of other landforms there.

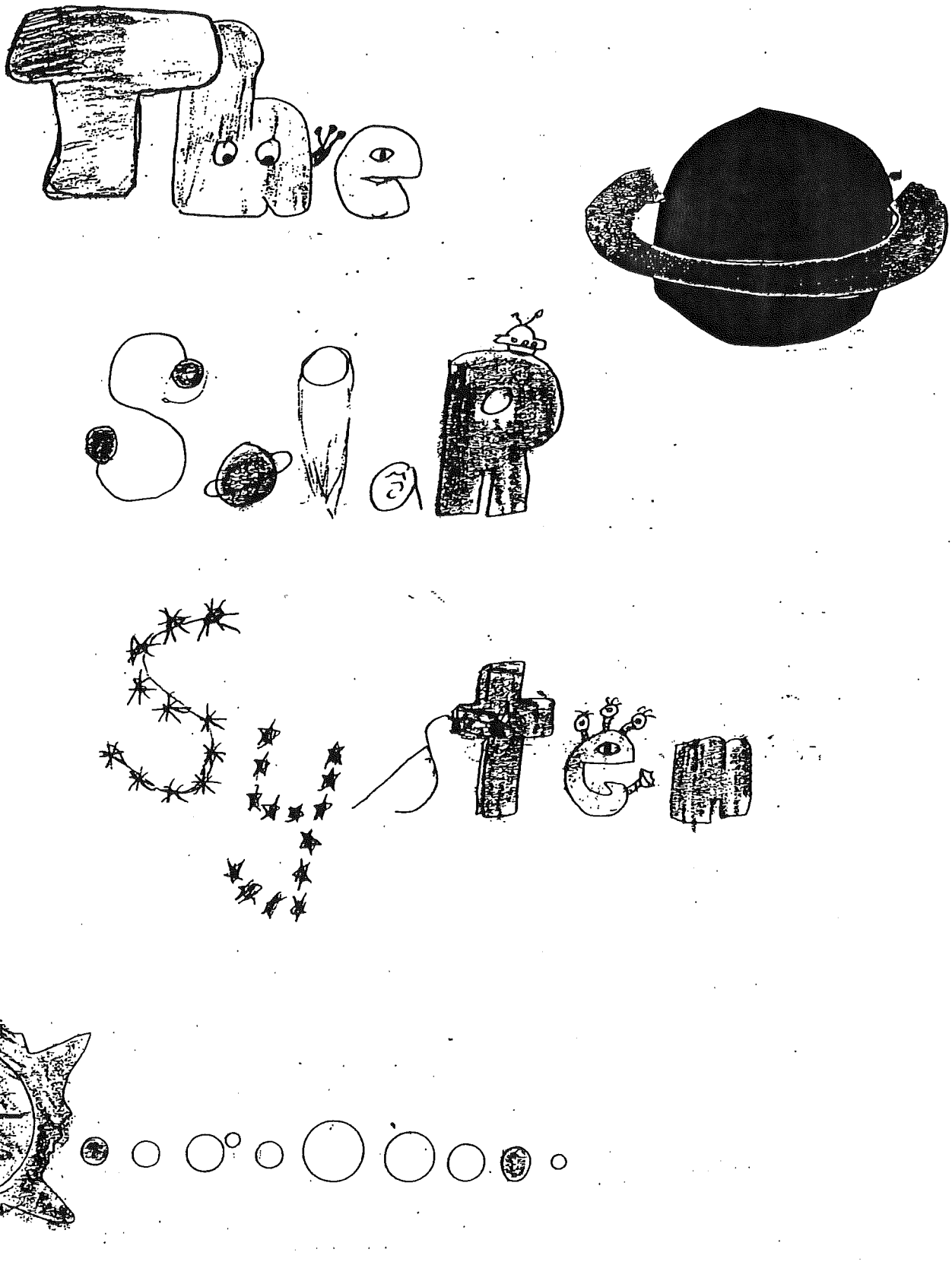
Draw the Moon and show the landforms you have found.



KNOWLEDGE 1



Appendix 7: Lois's topic book



SPACE CONTRACT

Name LOIS

I will complete the following work over the next five weeks.

KNOWLEDGE 3

1 2 3 4 5

COMPREHENSION 2 ✓✓

1 2 3

ANALYSIS 3 ✓✓

1 2 3 4

APPLICATION 2 ✓✓

1 2 3

SYNTHESIS 3

1 2 3 4

EVALUATION 3 ✓✓

1 2 3 4

Signed _____

Mercury

Mercury is the hotest planet in the universe. It closest to the sun. It is not the smallest planet. Astronauts have never been to Mercury because it is so hot and the engine would explode.

Pluto

Pluto is the coldest planet in the universe. Some people also say that is the smallest. Pluto has no gravity. It is cold because it is very far away from the sun Astronauts can't go to pluto because it is too cold and the engin would freeze.

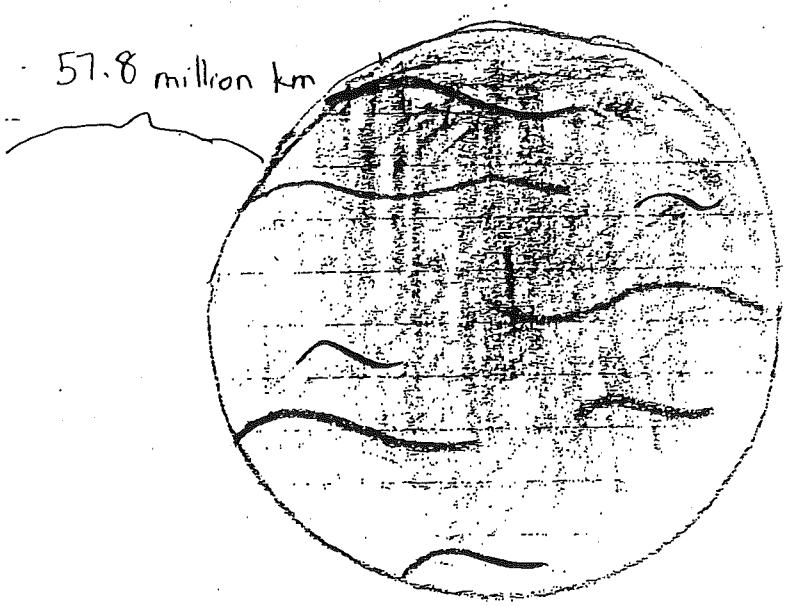
Evaluation 1

I think it is fair if animals travel in space aswell, because they are useful for trying out experiments. Long time ago astronauts went to space and never came back again since that happened scientists used a dog to go to space. The dog came back to earth savely. So we can try animals for experiments. Also dogs has good scenses so when they go outer space they can find interesting things eacily.

Analysis (1)

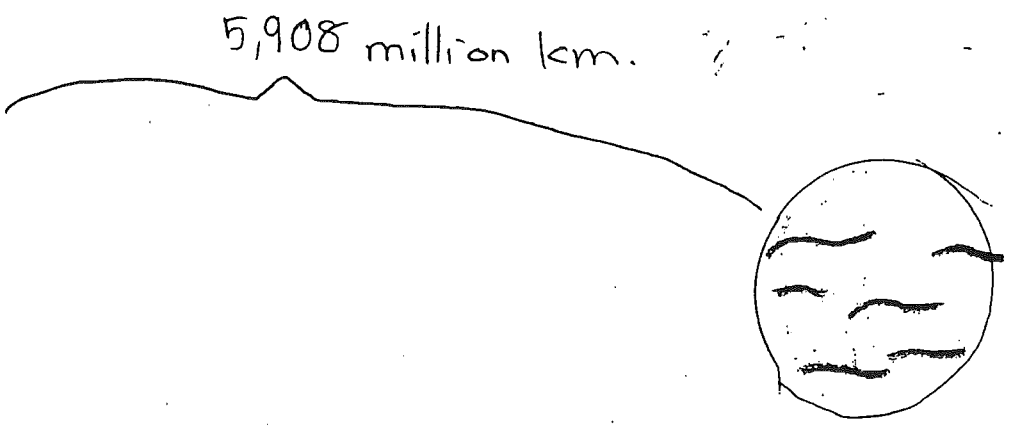
Mercury

Mercury is the 1st planet from the sun, or maybe the last. Its diameter is 4,900 km. An average distance from the Sun is 57.8 million km far. Mercury doesn't have any moons at all. Mercury goes around the sun for 88 days. Time taken for Mercury to turn around completely is 59 days. Mercury can bee seen from earth with our naked eye. Mercury orbits the sun. In 1976 Helios 2 travelled to within 45,000,000 km of the Sun. This is closer than Mercury. Mercury is made out of rocks and gases.



Pluto

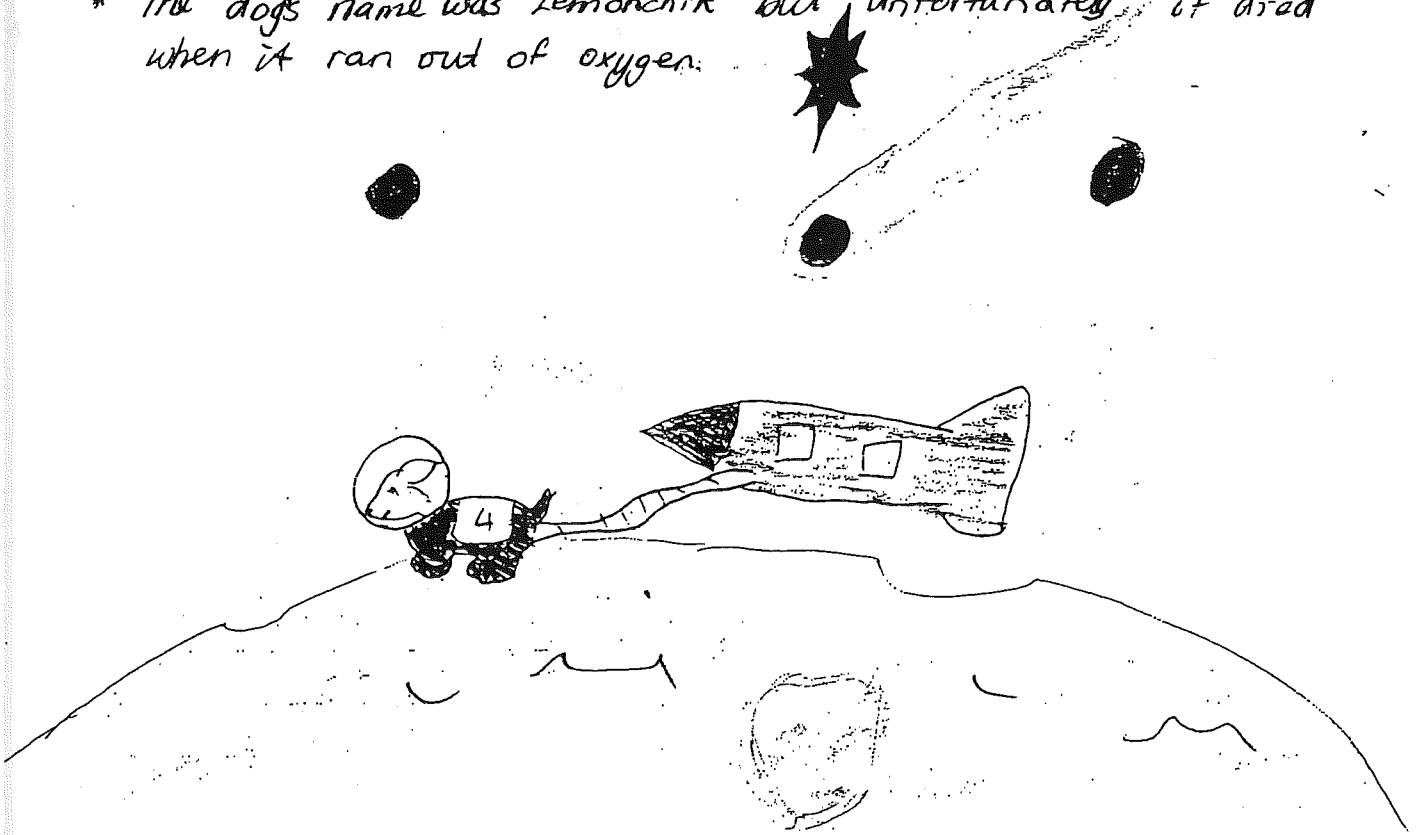
Pluto is the coldest planet. It is further away from the sun.
Plutos diameter is 5,800km. The average distance from the Sun is 5,908 million km. Pluto has 1 moon as well. Time taken to go around the Sun is 247.7 years. Time taken to turn completely is 6 days and 9 hours. Pluto was not discovered until 1930. Photographs taken on different nights were compared.
Pluto is the most distant planet in our Solar System. It is over 5 billion km from Earth



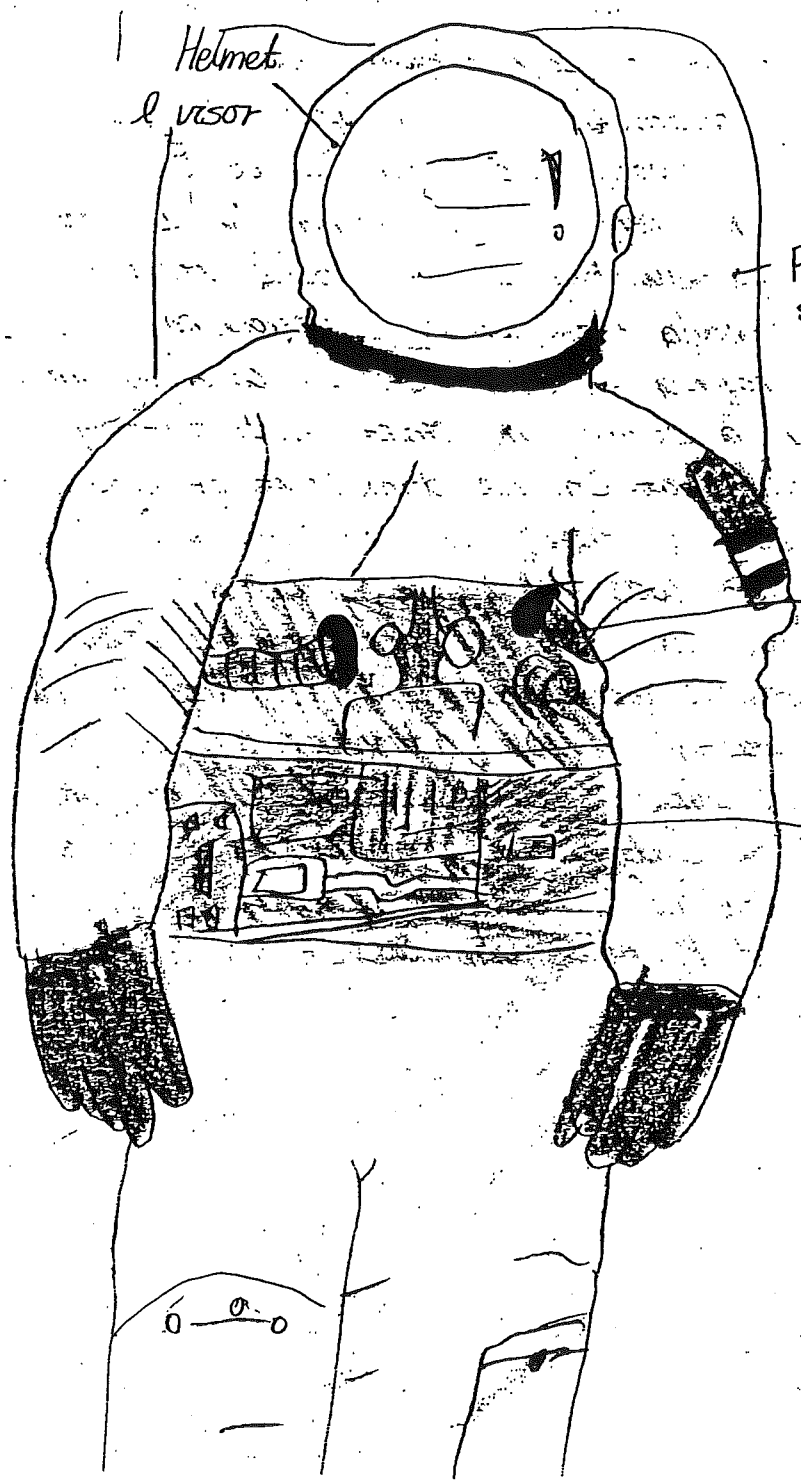
Evaluation 1

I think it is fair for animals to travel in space, because we can use them for experements. Long time ago a dog travelled in space instead of human just so that they didn't make any mistakes. This happended because just before the dog other astraunauts travelled to space and never came back again. When other astranauts went to Mars they saw a figure in the ground, so they carefully put the dust out and the figure was a figure of a face. Now Scientists think that that face could be the lost astranauts. But they just think like that. So after that accident happened they became terrified and no other astranauts wanted to go into space ever again. So they sent a dog there. Next time maybe we could try a cat or a mouse any animal for more experements.

* The dogs name was Lemonchik but Unfortunately it dead when it ran out of oxygen.



ရှုခင်းဓာတ်ပုံများ (၁)


Helmet
& visor
Portable life support system.
oxygen & cooling tube.
Remote backpack control unit.

Synthesis (4)

In 1984 I, went to Pluto. Well I was going to, I tried to but I didn't quite make it. So I'll tell you all my adventure. On I went from Earth. Scientists said that I would take about 5~6 years because that how much they would give support to me. On I went to Pluto. I was excited and serious because if I made any mistakes on the rocket I would be gone forever. The two weeks later I could see the moon! I wanted to land there, but unfortunately I wasn't allowed. 2 years went by quickly I went pass Mars, but that wasn't what I was looking for. Then I sueddenly knew that I was floating around the rocket! It was so unreal. I was thirsty, in space we don't drink out of cups, because the water will float So we drink out of bags with straws. I said 'we' because there was someone else with me, my assistant Ico. It was fun floating around. For dinner we threw the food into the air and gobbled it up chasing after the food. We went passed Jupiter and 4 years passed. Still we were waiting for our adventure and we were not going to give up yet. 6 years passed. Oh no! 6 years and we are still at Saturn. 3 more planets to go and .... and we didn't make it! So our adventure was over. But still there would be other astranauts trying to make there the smallest planet Pluto.

Comprehension 3

Earth is different to all the other planets because...

* It's got the most gravity, the gravity pull in the middle of the Earth. That is why we can fly. If there was no gravity on Earth we would be floating around everywhere

* It is the only planet with living organisims. Earth has living things on it. Its including us, people, humans.

* There is air to breathe (Oxygen + carbondioxide.) Humans live by breathing Oxygen. Plants & trees live by breathing in carbondioxide.

* The most important thing about Earth is that there is water. Nearly $\frac{3}{4}$ of the Earth is covered in water. (H_2O).

* Earth is the 3rd planet from the Sun.

* So think how important Earth is. Save the Earth from pallution. Don't ~~throw~~ throw rubbish on the ground. If Earth dies maybe there will be no living organisms in our galaxy!

Knowledge (2)

An astronaut

An astronaut is a person who travells in space and goes in the rockets.
A total of 12 astronauts have landed on the moon. The rockets were Apollo 11, 12, 14, 15, 16, and 17. Unfortunately Apollo 13 had many technical problems. It was unable to land. But the crew on Apollo 13 had to fly the damaged space craft by using the stars' position as a guide. They landed safely back on Earth.
Astronauts have special training to prepare them for the feeling of weightlessness in space. Before their flight, astronauts often rehearse space experiments and mission underwater. There is no air in space, so astronauts are able to carry out experiments which cannot be done on Earth. Rather than bring satellites back to Earth for repairs, astronauts can make adjustments in space.

An astronomer

An astronomer is a person who studies planets and the Sun. Stars as well.
Anyone can study the night sky! You can stargaze from your back garden and even a small telescope gives a better view of the stars. Astronomers usually study Astronomy, mathematics, physics or another science at university, and work on observatories around the world as part of their training. So when astronomers were about 10 or 11 and there dream was being an astronomer they could have went outside and got a telescope and looked up at the night sky. If you want to be an astronomer look at the night sky and write facts about it. Astronomers has to sometimes take care for astronauts & see if they are staying healthy or if they need more oxygen or something.

Analysis (4)

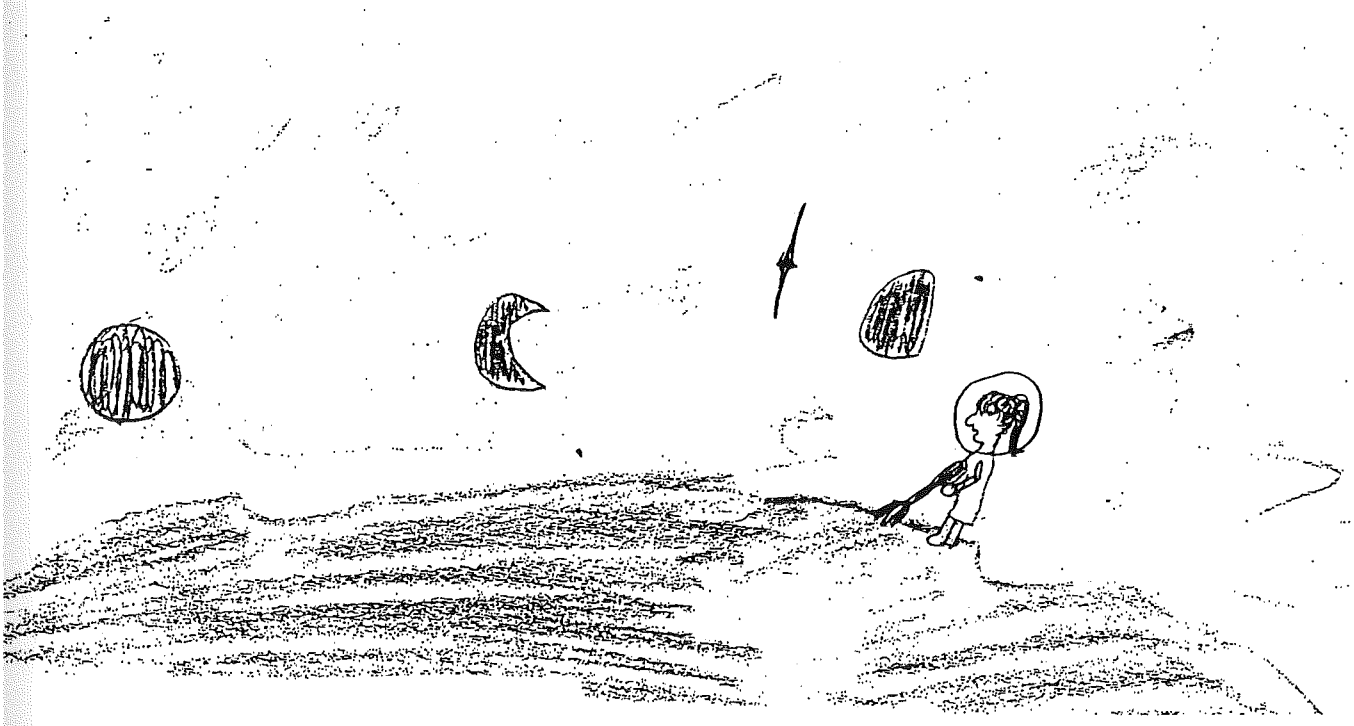
IS SUN A PLANET?

No the Sun is not a planet. Planets are usually made out of dusts and rocks.
Planets orbit the Sun. They are pulled by magnetic chemicals. The Sun is actually a star, why?, because the Sun is made out of burning gases made by hydrogen and helium gas. And stars are burning gases too.
Without the Suns light and heat, nothing could survive on Earth. The Sun is very hot! Its surface is 6,000°c and the temperature at the centre measures 15 million°c
Even the Sun looks small to us it is actually one million times bigger than our Earth.
Without the Suns rays, life on Earth would die. Plants needs the Suns light to change carbon dioxide and water into the food they need called photosynthesis.
The Sun will last for many millions of years! In about 5 million years' time, the Sun will have burnt up all of its hydrogen fuel. It will become a hundred times as bright as it is now, and swell up to swallow the nearest planets, including Earth! After another 100 million years the Sun will shrink to become a little white dwarf star.
The Sun is important because...

* It provides us with light and heat
* Without the Sun everything would die.
* It provides photosynthesis.
* Without the Sun the Earth will be completely dark.

Evaluation 4

I would like to live on Earth, because it is the only planet with oxygen other living organisms and food. Earth also has water. Nearly $\frac{3}{4}$ of the Earth is covered with water. Earth is so important to us. Earth is just so so perfect for us. But if Earth dies (I hope not) I would like to live on Mars, because it is close to the Earth and Mars have mountains too. But Mars is red. So when I go to Mars; I'll make it non-rusty and shiny. I'll make it my planet. I'll be incharge of it. I'll put fake plants all though they wont look as nice but unless I have something to look at. Mars has 686 for a year. That means I'll have to wait for my birthday. So I'll say this, because I'll be in charge I'll have three birthdays a year that would be so nice. And all I'll want for my birthday on Mars would be stars! Mars have 2 moons so I'll steal another moon from Saturn. Saturn has 18 moon. Saturn has so many that I'll take one. But all these things I wrote would not be true. So I'll live on Earth now till it dies.



Comprehension (1)

Astronauts Diary

Dear Diary

Right now a man ran out of oxygen while on the moon but he is O.K..
Now days thing are very comfortable because of the new Scientific things.
In Space, weightlessness makes it very difficult to eat meals off plates. Instead we suck food out of tubes. Long time ago we had to just eat with it on the plate. When the food goes floating around we had to chase in around trying to catch it. I grew 4cm. Its because without the pull of Earths gravity, people become about 2cm taller. I however grew 4cm taller because I stayed in Space too long. Its also easy being trained too. I'm sort of nervous because tomorrow I'm landing on the moon. I keep on wandering, 'What happenes if my oxygen tank runs out?' A lot of people did. They died some of them. I hope I don't become like that man just then.

Evaluation (3)

◎ Advantages of living in space.

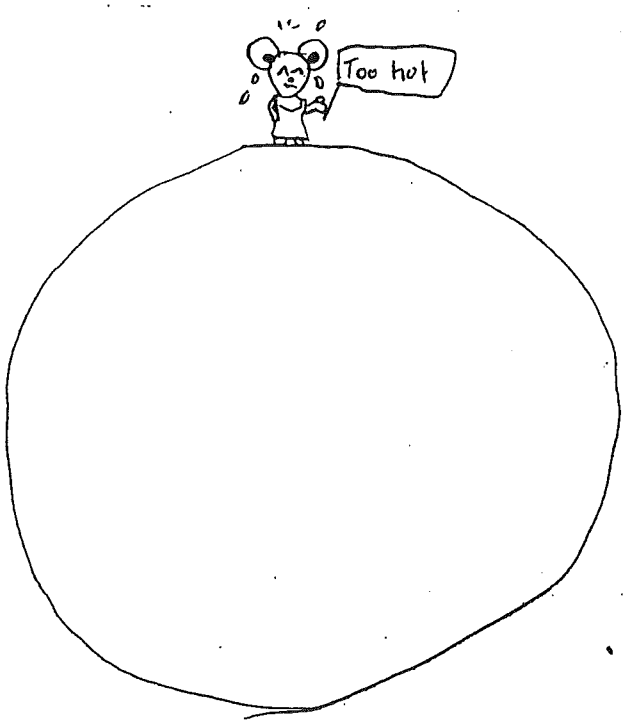
* We could take things back to Earth.
* We could contact to other galaxies.
* We could ge fuel from Jupiter.
* Scientists could be accurate about space.
* Everybody could go to space.
* We could have fun and float around.

◎ Disadvantages of living in space

* It takes a million dollars to go to space so not everybody could live there
* Some places would be too cold.
* Some places would be too hot
* Some planets have no water.
* We would be dying of food.

Analysis (2)

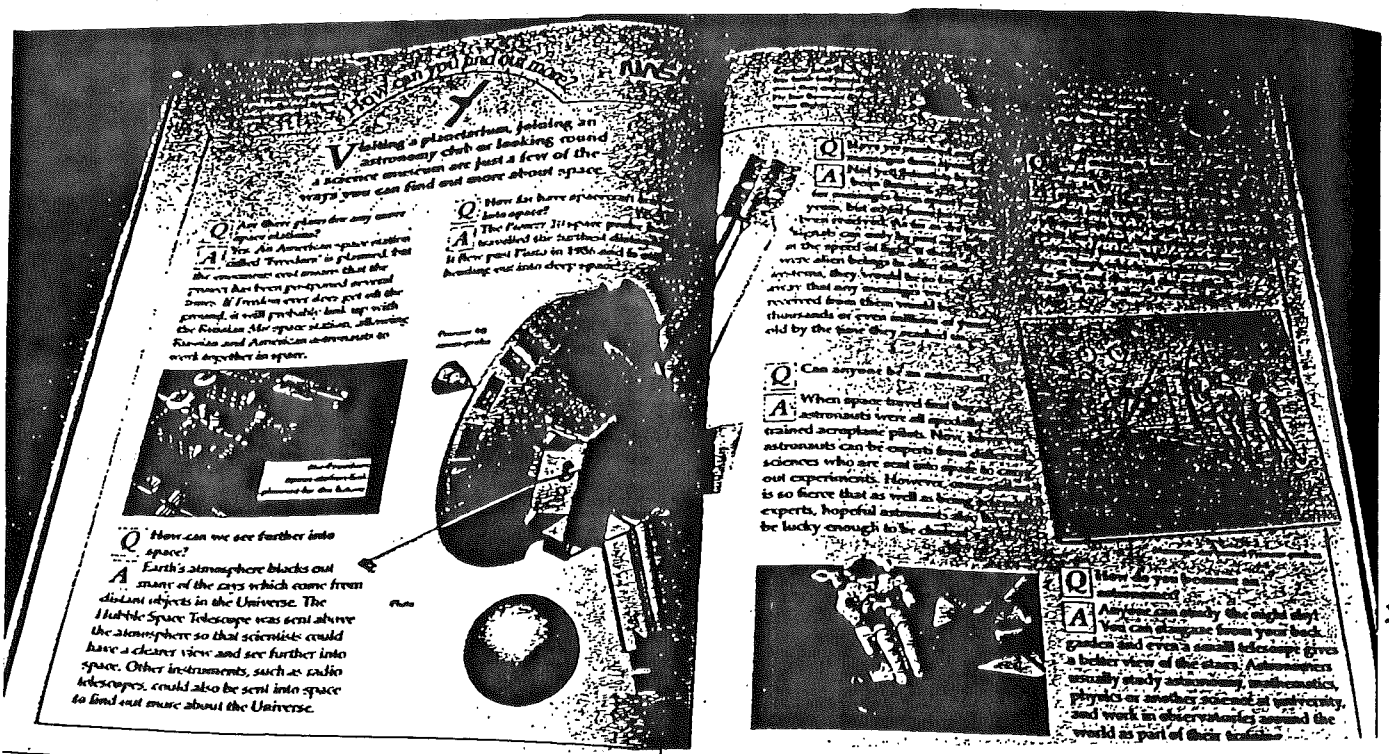
I chose Mercury & Pluto. I think neither of them are suitable for colony; This is because Mercury is too hot & Pluto is too cold.
No Scientists have been there or astronauts. But on person took lots of pictures.
If we wanted to live in Mercury we could live way at the bottom.
If we wanted to live in Pluto we'll have to live towards the sun.



Knowledge (3)

Name Person	Name	Date	Where from?	
	Sputnik 1	1957	Russia	

Appendix 8: "Outer Space" book and Lois's written work, Day 7



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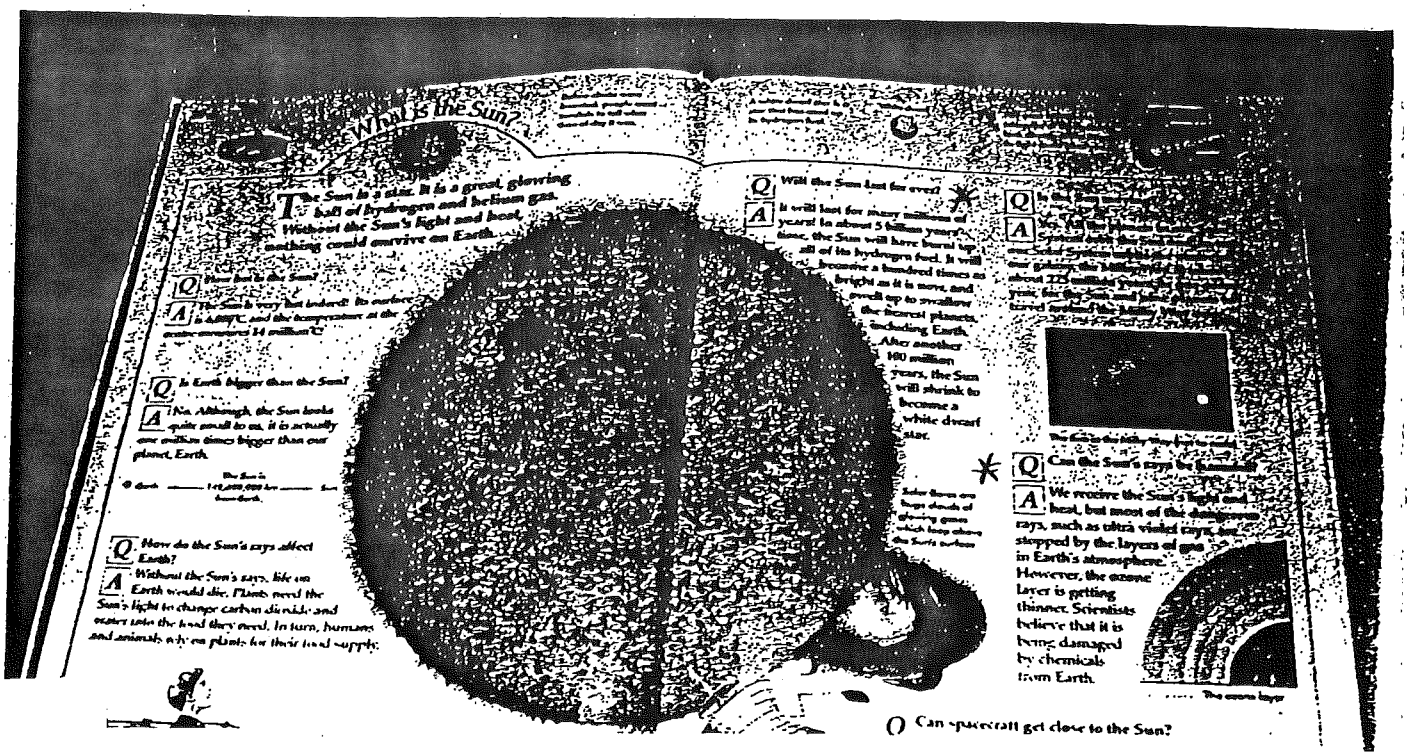

Analysis (4)

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* Without the Sun the Earth will be completely dark

Evaluation 4

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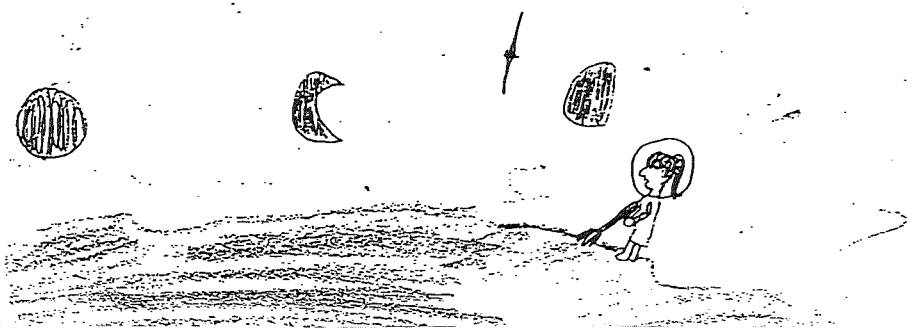

Comprehension (1)

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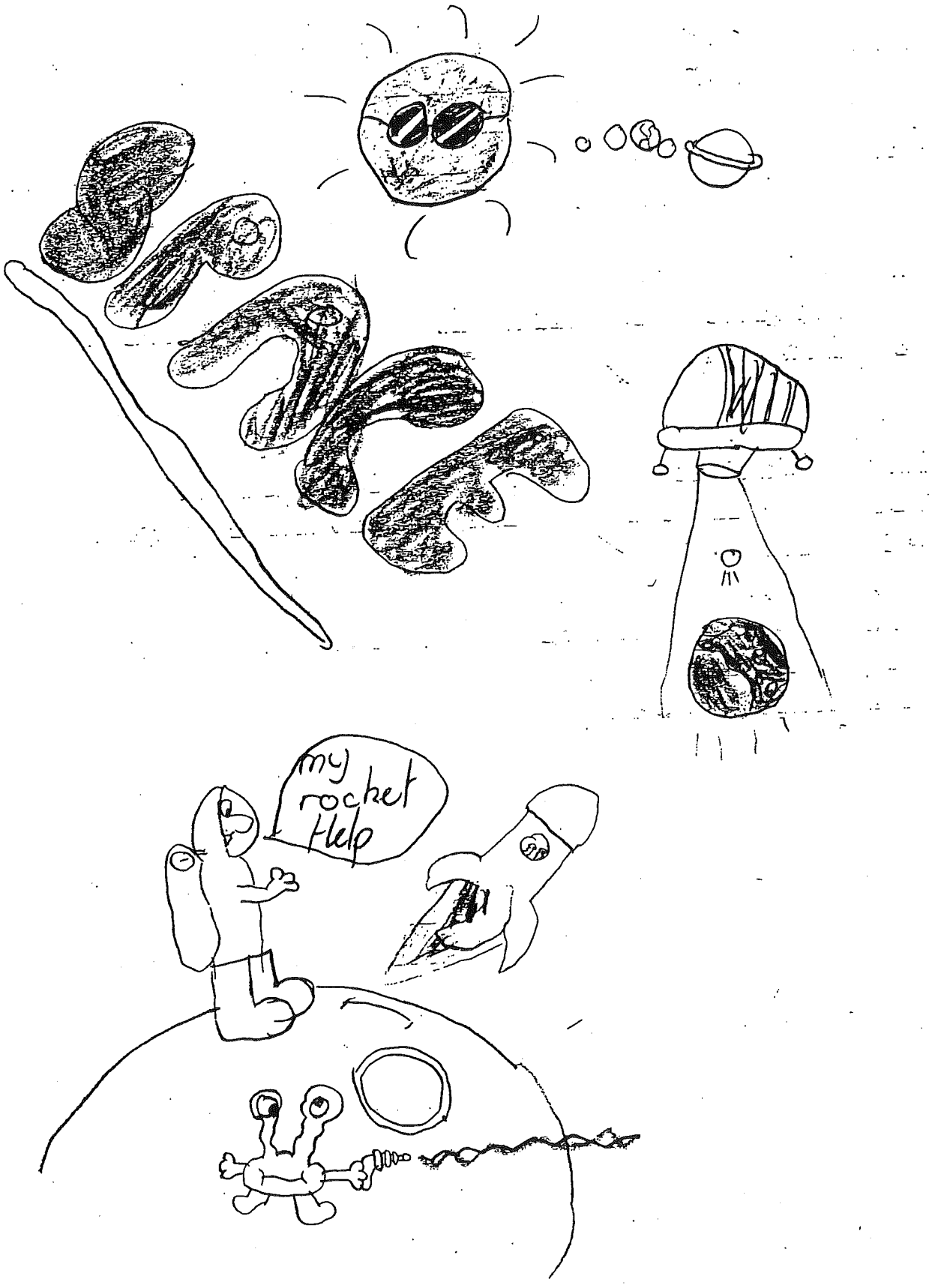
Appendix 9: Joseph's topic book



Comprehension 3

the world is different from other planets because the world has 70.1 water it actuly has water it has life form and man made things (T.V computer) it has plants air and Gravity (other planet have gravity too) it has birds fishes animals and mamals it has trees and the best computer

Evaluation 1

I think it is unfair on the animals to send to space and research on it how would you like being researced on space with limited air it is cruel unfair and torture

Analysis 4

the sun is not a planet it is a star and there are only nine planets in the solar system the world needs sun because it need light heat, make plants grow and makes the water cycle work (the sunn pull the sea up into the clouds)

Synthesis 4

It all started on a school trip to the museum. We were studying space we looked at rockets, the solar system every thing but we were not aboud to touch any thing. But when I saw it I had to touch it it was a rocket I went inside it and stared playing around

then thats when it happend I pushed the button that said "take off" I took off crashed through the roof and set the museum on fire. I could not control it I then pushed a autofly button now I am safe thats what thought anyway. I had no idea where I was going I decied I better go to sleep and I was feeling really hungery. I got some space food it was not like you have at home. Now for the entertainment I pushed a button that said no gravity Wahoo I was flying I flyed to the control panel we were about to crash. I got a space suit and hanged on! Crash! We landed I was on mars then I heard voises I wanted to go home there was no excape my space ship had blowup I'm doomed then thats when it happened First one eye, then two it was a alien. I said "I bring peace" then it said "△□ZOX" it made no sence at all then it pointed at me and made a follow me signal. I dont know why I did but I followed it. I thought aliens were dumb they had computers every thing. He spoke into a miriphone and then I could understand it "We will fix you space ship" then I said "thanks" I have got to admit it I was

scared OS them. They took 5 spbr seconds to six it. They pushed me ons and, pushed "△□○" and it took OSS. It was Sast next thing I know I'm on bed the next morning I went to school and I was on big trouble for disapering from school.

The moon and its orbit

Day of orbit	Phase of moon	Apering
1 the first day	new moon	moon invisible
8	first quarter	half moon
15	full moon	complete moon
22	last quarter	half moon

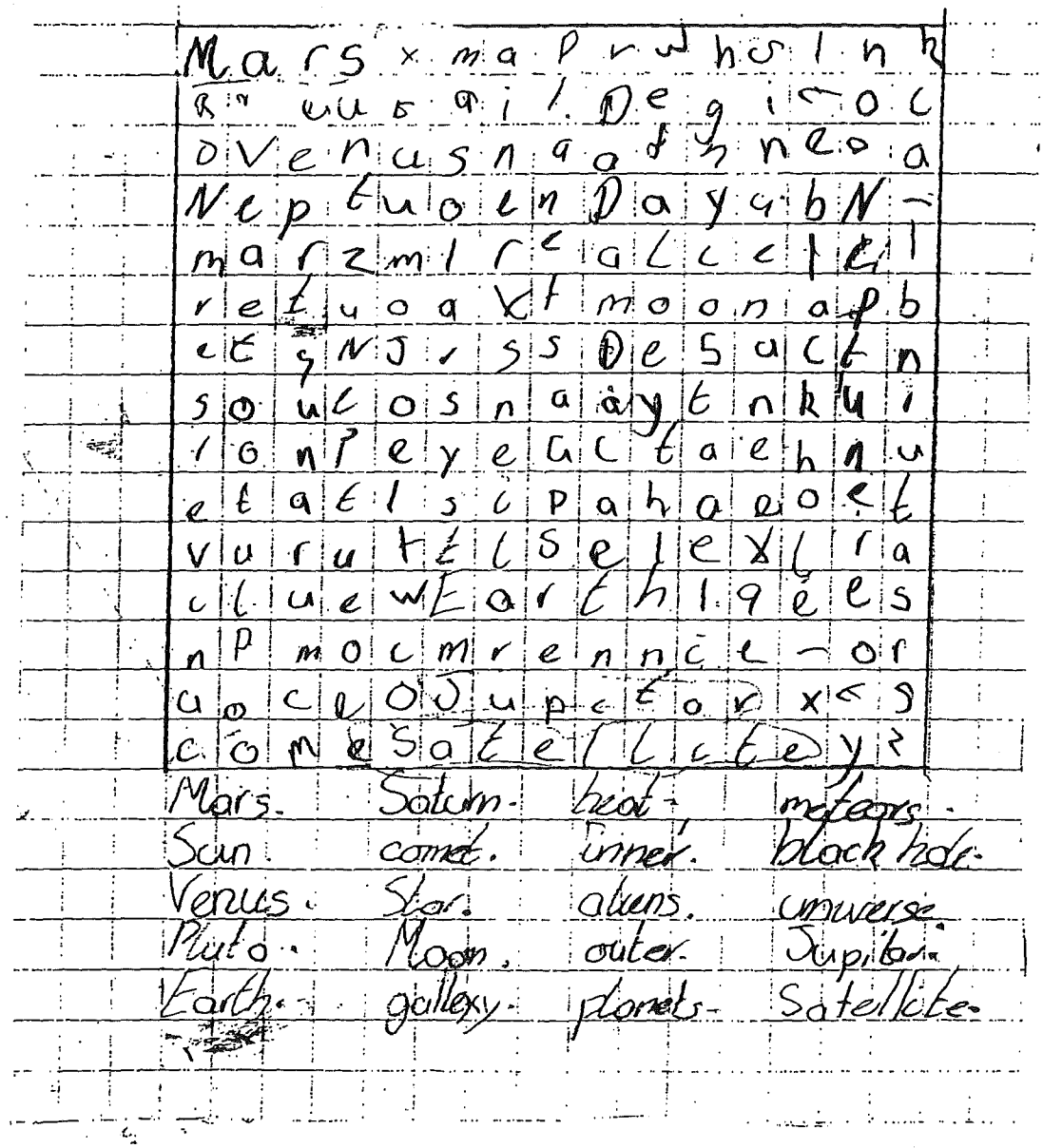
Synthesis 1

every time the world spins round
es a day
some people don't believe it but it true
anyway.
the world has life form no other has.
to stay cool
don't crash the school
you'll just be trashing the world

Fact file on mars

1 how far is it from the Sun? 227,900,00
2 it is the fourth planet from the sun
3 how long does it take to orbit the sun 686.98 days
4
5 Does it have any satellites (moons) Phobos, Deimus
6 Does it have any rings no
7 What is it diameter 6,787
8 how long does it take for the sun to each at 24.62 hours
a what is its surface like? Rusty
b what is its atmosphere like? carbon dioxide
11 what or who is it named after Pluto
12 other interesting facts I have discovered about this planet that mars is red because it became all rusty

comprehension 2



Mars.	Saturn.	heat.	meteors.
Sun	comet.	inner.	black hole.
Venus.	Star.	aliens.	universe.
Pluto.	Moon.	outer.	Jupiter.
Earth.	galaxy.	planets.	Satellite.

Appendix 10: Abby's topic book

SPACE CONTRACT

Name ABBY

I will complete the following work over the next five weeks.

KNOWLEDGE 2

1 2 3 (4) 5

COMPREHENSION 1 ✓

1 (2) (3)

ANALYSIS 1

1 2 3 4

APPLICATION 1 ✓

1 (2) 3

SYNTHESIS 2

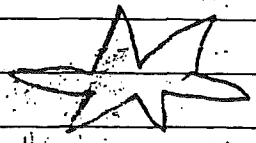
(1) 2 (3) 4

EVALUATION 1

1 2 3 4

Signed _____

Knowledge



Stars: A heavenly body that is seen as a small point of light in the sky.

planet: A heavenly body which travels in orbit around a Sun such as Earth and Mars.

comet: A heavenly body which looks like a star with a tail of light.

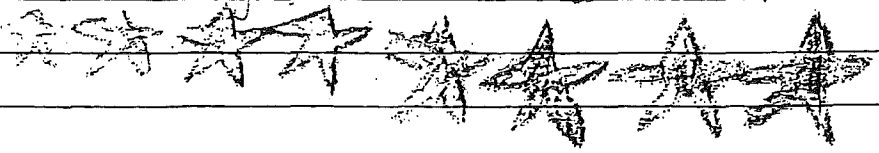
Solar system: The sun and the planets that revolve around it.

Satellite, A planet with moons etc that moves in orbit around another planet. ex. the moon and satellite of the earth

Orbit: the curved path taken by something moving.

galaxy - A very large group of stars.

milky way - the broad bright band of stars formed by our galaxy



orbit -

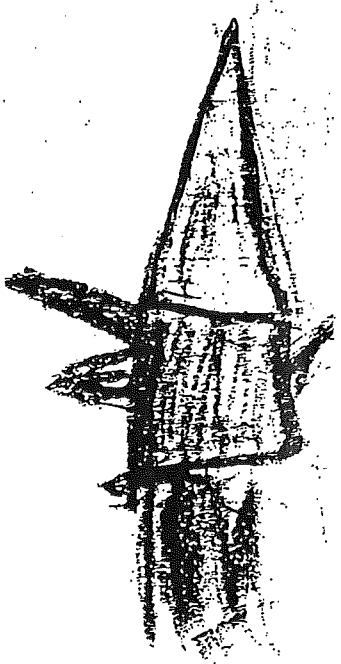
light year -

DURKHEIM

Why is the earth different from othe planets.

The earth is different from other planets because it has got more air and dirt and ugly.

EARTh	PANETS
We have stars We have rocks We have sun and a moon We have water and plants.	They have planets They have blackhole They have rockets They have comets.



cool facts about venus

How big across = 7520 miles
How long is one rotation = 243 days
How long is one year = 224.7 days
How far from the sun = 67.6 million
How many moons = none
How many rings = none

why I want to know about Saturn

How big across = 74,565 miles
How long is one rotation = 10.25 hours
How long is one year = 29.9 earth years
How far is it from the sun = 891.8 million miles
How many rings = lots

Saturn will float in water

Pluto

It is the same size as it moon.

How big across = 1,438

SYNTHESIS 1.

'Knock Knock'
'Who's there
Alien
Alien who
Alien I want to eat you

Humpty Dumpty [illegible]

Twinkle, [illegible]
star bright
star light
first star I see
I wish I may
I wish I might
I wish all night

stars
plant
comet
solar system
satellite.
orbit
galaxy
milky way
light year

earth
moon
sun
space
asteroid
mars
light.
Neptune

UNIT 1 Moon and it's orbit

Day of lunar orbit	Phase of moon	Appearance
1	New moon	moon invisible
8	first quarter	half moon right side vis
15	full moon	
22	last quarter	

comprehension 2.1

l	i	g	h	t	,	d	p	t	l	n	c	m	u	v	z	m	
i	d	t	r	a	p	a	l	a	x	y	z	e	v	x	a	e	
g	k	,	n	c	x	y	s	r	q	m	o	n	m	e	t	g	
h	a	p	k	x	a	p	r	c	p	j	c	v	x	r	h	q	
1	k	s	t	a	r	s	d	n	m	o	l	s	h	o	d	f	
y	d	l	p	s	i	k	a	t	u	v	y	e	p	t	k	l	
e	w	c	x	t	t	t	z	w	l	s	c	u	l	a	c	h	
a	t	a	t	e	a	z	p	k	r	j	d	m	c	b	c	e	
r	s	o	k	r	s	p	u	a	z	v	u	m	u	c	f	i	
g	o	s	c	o	c	w	\	m	p	u	o	p	a	x	z	p	
j	t	p	v	i	r	o	o	a	z	o	c	r	k	r	v	l	
s	e	f	t	d	s	c	r	c	n	t	f	z	h	v	s	s	
b	m	e	a	t	o	a	n	t	c	t	e	d	v	i	c	x	
a	o	p	t	m	k	t	g	b	x	p	s	z	f	v	t	r	
q	c	g	h	b	t	u	/	y	z	y	e	y	g	c	f	e	
p	q	r	m	i	l	k	y	w	a	y	k	c	b	k	l	g	
n	t	h	o	c	h	e	g	g	d	n	e	p	t	u	n	e	
g	i	l	f	j	s	g	s	u	n	u	t	h	r	a	e	p	
s	q	t	e	l	l	t	t	e	a	c	e						

Appendix 11: Day 9 activity, Study 17 Dion and his Group

MOON SHOT

(Group Summary Sheet)

	Individual Predictions 1 2 3 4 5 6 7 8 9 10	Group Prediction	My Score	Group Score
box of matches		8 10	I chose it's too black	
food concentrate		3	It stops your hunger pains in stomach	
50 feet of nylon rope		8 9	To keep us out of danger	
parachute silk		12 13	A blanket	
portable heating unit		5	To keep warm enough to live	
two .45 calibre pistols		15	These won't be too useful	
one case dehydrated pet milk		11	To drink	
two 100 lb tanks of oxygen	1	1		
stellar map (of the moon's constellation)		8 9	To know where we are	
life raft		14	Incase of crash	
magnetic compass		12	To tell us which way we are going	
five gallons of water		2	Your body needs water	
signal flares		7	They send signals to the mother ship	
first aid kit containing injection needles		4		
solar-powered radio receiver-transmitter		6	To get signals from the mother ship	

MOON SHOT

(The Task)

INSTRUCTIONS:

You are a member of a space crew originally scheduled to rendezvous with a mother ship on the lighted surface of the moon. However, due to mechanical difficulties, your ship was forced to land at a spot some 200 miles from the rendezvous point. During re-entry and landing, much of the equipment was damaged. Since survival depends on reaching the mother ship, the most critical items available must be chosen for the 200 mile trip.

Below are list the 15 items left intact and undamaged after landing. Your task is to rank order them in terms of their importance for your crew in allowing them to reach the rendezvous point. Place the number 1 by the most important item, the number 2 by the second most important, and so on through number 15, the least important.

You will have ten minutes for this task. Work alone, do not consult with the other members of your group.

13 - Box of matches
4 - Food concentrate
10 - Fifty feet of nylon rope
11 - Parachute silk
2 - Portable heating unit
12 - Two .45 calibre pistols
3 - One case dehydrated pet milk
1 - Two 100 lb tanks of oxygen
8 - Stellar map (of moon's constellation)
15 - Life raft
6 - Magnetic compass
3 - Five gallons of water
14 - Signal flares
5 - First aid kit containing injection needles
9 - Solar-powered FM receiver-transmitter

MOON SHOT

(Group Summary Sheet)

	Individual Predictions 1 2 3 4 5 6 7 8 9 10	Group Prediction	My Score	Group Score
box of matches	15	So we can build a fire So we don't get cold		
food concentrate	7	To keep us safe		
50 feet of nylon rope	10	So we don't freeze		
parachute silk	9	So we don't freeze		
portable heating unit	5	To protect through [illegible]		
two .45 calibre pistols	11	To feed us		
one case dehydrated pet milk	14	It will [illegible]		
two 100 lb tanks of oxygen	1	So we can find the Moon quickly so we can get out.		
stellar map (of the moon's constellation)	4	So we are where we are.		
life raft	8	With [illegible]		
magnetic compass	15	So some body should see us.		
five gallons of water	6	If we get hurt.		
signal flares	3	So we can go		
first aid kit containing injection needles	12			
solar-powered radio receiver-transmitter	2			

MOON SHOT

INSTRUCTIONS: (The Task)

You are a member of a space crew originally scheduled to rendezvous with a mother ship on the lighted surface of the moon. Due to mechanical difficulties, however, your ship was forced to land at a spot some 200 miles from the rendezvous point. During re-entry and landing, much of the equipment was damaged. Since survival depends on reaching the mother ship, the most critical items available must be chosen for the 200 mile trip.

Below are list the 15 items left intact and undamaged after landing. Your task is to rank order them in terms of their importance for your crew in allowing them to reach the rendezvous point. Place the number 1 by the most important item, the number 2 by the second most important, and so on through number 15, the least important.

You will have ten minutes for this task. Work alone, do not consult with the other members of your group.

14 - Box of matches

9 - Food concentrate

4 - Fifty feet of nylon rope

11 - Parachute silk

5 - Portable heating unit

10 - Two .45 calibre pistols

12 - One case dehydrated pet milk

6 - Two 100 lb tanks of oxygen

3 - Stellar map (of moon's constellation)

7 - Life raft

15 - Magnetic compass

8 - Five gallons of water

2 - Signal flares

13 - First aid kit containing injection needles

1 - Solar-powered FM receiver-transmitter

MOON SHOT

(Group Summary Sheet)

	Individual Predictions 1 2 3 4 5 6 7 8 9 10	Group Prediction	My Score	Group Score
Box of matches		10	cook food because we need to eat	
food concentrate		3		
50 feet of nylon rope		11		
parachute silk		6	To slow down	
portable heating unit		4	To keep warm	
two .45 calibre pistols		12		
one case dehydrated pet milk		15	We don't	
two 100 lb tanks of oxygen		1	You need oxygen to breath	
stellar map (of the moon's constellation)		9	to know where we are going	
life raft		8	So we don't crash	
magnetic compass		13		
five gallons of water		2	You will die without water	
signal flares		8	To attract other spaceships	
first aid kit containing injection needles		5	Incase some one gets sick	
Solar-powered radio receiver-transmitter		14		

MOON SHOT

(The Task)

INSTRUCTIONS:

You are a member of a space crew originally scheduled to rendezvous with a mother ship on the lighted surface of the moon. Due to mechanical difficulties, however, your ship was forced to land at a spot some 200 miles from the rendezvous point. During re-entry and landing, much of the equipment was damaged. Since survival depends on reaching the mother ship, the most critical items available must be chosen for the 200 mile trip.

Below are list the 15 items left intact and undamaged after landing. Your task is to rank order them in terms of their importance for your crew in allowing them to reach the rendezvous point. Place the number 1 by the most important item, the number 2 by the second most important, and so on through number 15, the least important.

You will have ten minutes for this task. Work alone, do not consult with the other members of your group.

11	12	Box of matches
3	13	Food concentrate
9	9	Fifty feet of nylon rope
6	6	Parachute silk
4	4	Portable heating unit
12	11	Two .45 calibre pistols
15	10	One case dehydrated pet milk
1	1	Two 100 lb tanks of oxygen
10	15	Stellar map (of moon's constellation)
7	8	Life raft
13	13	Magnetic compass
2	2	Five gallons of water
8	7	Signal flares
5	5	First aid kit containing injection needles
14	14	Solar-powered FM receiver-transmitter

Appendix 11: Day 9 activity, Study 17 Abby and her Group

MOON SHOT

(Group Summary Sheet)

	Individual Predictions 1 2 3 4 5 6 7 8 9 10	Group Prediction	My Score	Group Score
box of matches		15	Food	
food concentrate		3	Vathy	
50 feet of nylon rope		8		
parachute silk		12		
portable heating unit		4	To keep warm	
two .45 calibre pistols		10		
one case dehydrated pet milk		14		
two 100 lb tanks of oxygen		1	Need air to breath	
stellar map (of the moon's constellation)		12		
life raft		13	Emergency food radio	
magnetic compass		2	Food and Drink	
five gallons of water		15	So people can find us	
signal flares		9	If someone gets hurt	
first aid kit containing injection needles		6		
solar-powered radio receiver-transmitter		8	Can't talk to them	

MOON SHOT

(The Task)

INSTRUCTIONS:

You are a member of a space crew originally scheduled to rendezvous with a mother ship on the lighted surface of the moon. Due to mechanical difficulties, however, your ship was forced to land at a spot some 200 miles from the rendezvous point. During re-entry and landing, much of the equipment was damaged. Since survival depends on reaching the mother ship, the most critical items available must be chosen for the 200 mile trip.

Below are list the 15 items left intact and undamaged after landing. Your task is to rank order them in terms of their importance for your crew in allowing them to reach the rendezvous point. Place the number 1 by the most important item, the number 2 by the second most important, and so on through number 15, the least important.

You will have ten minutes for this task. Work alone, do not consult with the other members of your group.

7 - Box of matches

2 - Food concentrate

8 - Fifty feet of nylon rope

6 - Parachute silk

9 - Portable heating unit

10 - Two .45 calibre pistols

15 - One case dehydrated pet milk

1 - Two 100 lb tanks of oxygen

12 - Stellar map (of moon's constellation)

11 - Life raft

14 - Magnetic compass

3 - Five gallons of water

13 - Signal flares

4 - First aid kit containing injection needles

12 - Solar-powered FM receiver-transmitter